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Hacia una estructura de investigación y educación para la prevención de accidentes por incendios y explosiones en Colombia

Towards a research and education structure for the prevention of accidents due to fires and explosions in Colombia

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Contenido

Tabla 1S. Ejemplo de estudios relacionados con accidentes causados por incendios y explosiones en diferentes industrias.

Industria	**Referencia**
Explotación de gas y petróleo	(Pranesh et al., 2017)
Incendios forestales	(Collins et al., 2019; Q. Liu et al., 2018; Molina-Terrén et al., 2019)
Minería	(Sanmiquel et al., 2015; Jiangshi Zhang et al., 2020; Jinjia Zhang et al., 2020)
Obras civiles	(Kobayashi, 2017; Spearpoint & Hopkin, 2020)
Química	(Jung et al., 2020)

Tabla 2S Centros de investigación cuyo interés principal es la prevención de accidentes por incendios y explosiones[a].

Pais	Centro	Referencia
Alemania	Engler-Bunte-Institut	(Karlsruher Institut für Technologie, 2020)
	División de Dinámica de incendios del Jülich Forschungszentrung	(Forshungszentrum Jülich, 2020)
	Institut für Baustoffe, Massivbau und Brandschutz	(Technische Universität Braunschweig, 2021)
Australia	Fire Safety Engineering Research Group	(The University of Queensland, 2021)
China	State Key Laboratory of Fire Science	(University of Science and Technology of China, 2021)
Escocia	Edinburgh Fire Research Centre	(The University of Edinburgh, 2021)
España	Laboratorio Oficial “José María de Madariaga” (LOM)	(Laboratorio Oficial “José María de Madariaga” (LOM), 2021)
Estados Unidos	Fire Research Division del National Institute of Standards and Technology	(NIST, National Institute of Standards and Technology, 2021)
Francia	Centro para combustión heterogénea y medios porosos	(Institut P’, 2019)
Inglaterra	Fire Safety Engineering Group	(The Faculty of Architecture, Computing & Humanities-University of Greenwich, 2021)
Irlanda	Fire Safety Engineering Research and Technology Centre	(Ulster University, 2021)
Polonia	Mina experimental Barbara	(GIG Research Institute, 2021)

[a]En la revisión se excluyeron los centros relacionados exclusivamente con entidades privadas

Tabla 3S. Programas de posgrado exclusivamente diseñados para mejorar la seguridad contra incendios y explosiones.

País	Programa	Referencia
Bélgica	M.Sc. en Fire Safety Engineering	(Ghent University, 2021)
Estados Unidos	M.Sc. en Fire Protection Engineering	(Cal Poly - College of Engineering, 2021; University of Maryland - Department of Fire Protection Engineering, 2021; Worcester Polytechnic Institute, 2021)
	Fire and Explosion Investigation	(University of New Haven - Henry C. Lee College of Criminal Justice and Forensic Sciences, 2021)
Inglaterra	M.Sc. en Fire Safety Engineering	(University of Central Lancashire, 2021)
Suecia	M.Sc. en Fire Safety Engineering	(Faculty of Engineering, Lund University, 2021)
Australia, Bélgica, Escocia, Estados Unidos, Suecia, Suiza	International Master of Science in Safety Engineering	(Ghent University et al., 2021)

Tabla 4S- Programas de posgrado e investigaciones relacionados con la parte académica (no gerencial) de la salud ocupacional y seguridad en el trabajo en diferentes instituciones académicas colombianas

Universidad	**Programa**	**Referencia**
Investigación		(Aguilar R. & Echeverri, 1992; Fernando, 2017; Moreno Chacón, 2011; Pareja Bayter & Ricardo Sanes, 1994; Riveros Álvarez, 2014)
Colegio Mayor Nuestra Señora del Rosario	Especialización en Salud ocupacional	(Escuela de Medicina y Ciencias de la Salud-Universidad del Rosario, 2021)
Pontificia Universidad Javeriana	Maestría en seguridad y salud en el trabajo	(Pontificia Universidad Javeriana, 2021)
Universidad de Antioquia	Especialización en Seguridad y Salud en el Trabajo	(Facultad Nacional de Salud Pública - Universidad de Antioquia, 2021)
Universidad Autónoma de Occidente	Maestría en Seguridad y Salud en el Trabajo	(Universidad Autónoma de Occidente - Facultad de Ingeniería, 2020)
Universidad de Boyacá	Especialización en Seguridad y Salud en el Trabajo (Virtual	(Universidad de Boyacá, 2021)
Universidad Católica de Manizales	Especialización en Seguridad y Salud en el Trabajo	(Universidad Católica de Manizales, 2021)
Universidad CES	Especialización en Seguridad y Salud en el Trabajo	(Universidad CES, 2021)
Universidad Manuela Beltrán	Especialización de Salud Ocupacional y Riesgos Laborales	(Universidad Manuela Beltrán, 2021)
Universidad Nacional de Colombia	Especialización en salud y seguridad en el trabajo	(Universidad Nacional de Colombia - Facultad de enfermería, 2021)
	Maestría en salud y seguridad en el trabajo	(Universidad Nacional de Colombia - Facultad de enfermería, 2021; Universidad Nacional de Colombia - Facultad de Enfermería, 2021)
Universidad del Norte	Especialización en Seguridad y Salud en el Trabajo	(Universidad del Norte, 2021)
Universidad Pedagógica y Tecnológica de Colombia	Especialización en Seguridad y Salud en el Trabajo	(Universidad pedagógica y tecnológica de Colombia, 2021)
Universidad del Valle	Maestría en Salud Ocupacional	(Universidad del Valle - Facultad de Salud, 2021)

Tabla 5S Investigaciones y programas de posgrados en Colombia que están relacionados con la ciencia e ingeniería de incendios y explosiones

Característica	**Referencia**
Programas de posgrados	(Facultad de Minas-Universidad Nacional de Colombia, 2021)
Universidad de los Andes	(Alvarez & Giraldo, 2018; Amaya-Gómez et al., 2019, 2020; Amaya et al., 2013; Amin et al., 2018; Castellanos-Vargas, 2018; Mariño et al., 2020; Mena et al., 2012; Mesa-Gómez, Casal, & Muñoz, 2020; Mesa-Gómez, Casal, Sánchez-Silva, et al., 2020; Murillo et al., 2018; Murillo Rueda, 2012; Ocampo Pantoja, 2014; Pico et al., 2020a, 2020b; Pinilla et al., 2019; J. Salamanca, 2012; Sedano et al., 2017; Serrano et al., 2020; Suarez-Paba et al., 2020; Torrado, 2017; Torrado et al., 2018; Vizcaya et al., 2018; Zapateiro Puente, 2017)
Universidad de Cartagena	(González Delgado, 2019; Zuorro et al., 2020)
Universidad Cooperativa de Colombia	(Cardoso Piñeros, 2020)
Universidad Distrital Francisco José de Caldas	(Ocampo-Zuleta & Beltrán-Vargas, 2018)
Universidad Nacional de Colombia	(Armenteras-Pascual et al., 2011; Bustamante-Rúa, Daza-Aragón, et al., 2019; Bustamante-Rúa, Daza Aragón, et al., 2019; Bustamante-Rúa et al., 2018; Forigua & Lyons, 2016; Fuentes et al., 2018; Garcia-Torrent et al., 2016; Jaramillo-Urrego, 2019; Jaramillo-Urrego et al., 2017; Molina-Escobar & Blandón, 2014; Ortega-Ramos et al., 2018; Pejic et al., 2017)
Universidad Sergio Arboleda	(Lozano & Rodriguez, 2011)
Diferentes industrias	(Miranda et al., 2003; Quintero et al., 2009)

Tabla 6S. Ejemplos de resumen de estadísticas de incendios y explosiones en algunos países y de estudios que las analizan

País	Característica	Referencia
China	Análisis de accidentes por químicos peligrosos	(H.-D. Zhang & Zheng, 2012)
	Accidentes y explosiones en minas de carbón	(Zhu et al., 2019)
Colombia	Dirección Nacional de Bomberos de Colombia	(DNBC Dirección Nacional Bomberos de Colombia, 2021)
Estados Unidos	Estadística	(U.S. Fire Administration, 2021)
	Información sobre cómo calcular estadísticas	(Hall & Harwood, 1989)
	Análisis de bases de datos de accidentes en minas de carbón	(Larry Grayson et al., 2009)
Japón	Ministry of Internal Affairs	(Statistics Bureau, Ministry of Internal Affairs, Japan, 2021)
Korea	Principales accidentes industriales	(Shin, 2013)
Reino Unido	Estadística	(GOV UK, 2016)
	Accidentes por incendios y explosiones	(Bradley & Baxter, 2002)
Suecia	Análisis de estadísticas de incendios	(Rosenberg, 1999)
Varios países	Accidentes en la industria de procesos	(Khan & Abbasi, 1999)
	Accidentes en la industria de transporte marítima	(Baalisampang et al., 2018)

Tabla 7S. Estudios realizados por investigadores asociados con Colombia que incluyen la caracterización de diferentes sustancias inflamables

Característica	**Referencia**
Combustibles líquidos	(Agudelo et al., 2011; Baldrich & Novoa, 2006; Benjumea et al., 2008; Cacua et al., 2011b; Zuleta et al., 2012) y sólidos(É. Arenas & Chejne, 2004; Blandon et al., 2008; Díez & Pérez, 2017; Jiménez et al., 2012; Orrego et al., 2010; Orrego-Ruiz et al., 2011; Reyes et al., 2003)
Fracciones de petróleo	(Baldrich Ferrer & Novoa Mantilla, 2007; León et al., 2020; Morantes et al., 2019; Poveda-Jaramillo et al., 2016; Villabona-Estupiñan et al., 2020)
Productos de la combustión	(Arias et al., 2021; Ávila et al., 2021; Botero et al., 2020, 2021; Cadrazco et al., 2019, 2020; Johnson-Restrepo et al., 2008; Mendoza et al., 2021; Oliveira et al., 2019; Parga-Lozano et al., 2002; M. Salamanca, Mondragón, Agudelo, & Santamaría, 2012; Soriano et al., 2020)
Propiedades claves de combustibles como velocidad de llama laminar, las dimensiones y temperatura de la llama, el índice Wobbe, los calores inferiores y superiores de combustión, los límites de inflamabilidad y el punto de rocío	(Álvarez et al., 2019; A. A. Amell et al., 2014; Burbano et al., 2011a, 2011b; Cacua et al., 2011b; Y. Cadavid & Amell, 2019; Cala et al., 2013; Cardona et al., 2013; Cardona Medina et al., 2013; Cardona-Vargas et al., 2020; Cardona Vargas & Amell-Arrieta Andrés Adolfo Arrieta Carlos, 2016; D. García et al., 2020; Gaviria et al., 2014; Gómez-Meyer et al., 2012; Gutiérrez Velásquez et al., 2017; Londoño et al., 2013; Rubio Gaviria et al., 2014; Saavedra et al., 2014; Uribe-Salazar et al., 2019; Yepes & Amell, 2013)
Propiedades de ignición de combustibles líquidos, sólidos y en motores de combustión interna	(Amador et al., 2017; Bermejo & Orozco, 2013; Cacua et al., 2011a; Duarte et al., 2014; Y. Liu et al., 2011; Molina & Shaddix, 2007; Mora & González, 2018; Shaddix & Molina, 2009; Vásquez Sierra & Herrera Builes, 2006; Yepes-Tumay & Cardona-Vargas, 2019)

Tabla 8S. Estudios relacionados con la cinética química en procesos que involucran sustancias combustibles que han sido estudiados por investigadores en Colombia

Descripción	**Referencia**
Análisis teórico	(S. Gómez et al., 2013)
Técnicas ab initio	(Calderón et al., 2015; J. F. Espinal et al., 2004; Juan F. Espinal et al., 2004, 2005, 2007; Jimenez-Orozco et al., 2018; A. Montoya et al., 2000; Alejandro Montoya et al., 2001, 2002a, 2002b, 2003; Palacio et al., 2018; Sanchez et al., 2019; Vélez et al., 2009)
Mecanismos para uso en combustión	(Quiceno et al., 2002)
Mecanismos para uso en equipos de craqueo de fracciones de petróleo	(López-Pérez, 2016)
Sistemas de combustión complejos	(Alvarado et al., 2009; Amador et al., 2017; Burbano et al., 2011b; Cardona Vargas & Amell-Arrieta Andrés Adolfo Arrieta Carlos, 2016; Saxena et al., 2013; Yepes & Amell, 2013)
Combustibles líquidos	(Padilla et al., 2017b)
Combustibles sólidos	(Rojas et al., 2012)

Tabla 9S. Investigaciones relacionadas con la combustión realizadas por investigadores colombianos

Descripción	**Referencia**
Relación con características de Colombia: altura sobre el nivel del mar (presión atmosférica), humedad y composición química de combustibles en aplicaciones relacionadas con aplicaciones industriales de la combustión	(Andrés A. Amell, 2007; Benjumea et al., 2011; Y. Cadavid & Amell, 2019; Y. López et al., 2020)
Análisis de desempeño de combustibles tradicionales	(Alvarado et al., 2017; Obando et al., 2017; Vásquez et al., 2020)
Combustión sin llama	(C. E. Arrieta et al., 2017; C. E. Arrieta & Amell-Arrieta, 2014; Colorado et al., 2010; Echavarría & Amell, 2017; Lezcano et al., 2017; C. C. Mejía et al., 2021; Sánchez et al., 2013; Yepes et al., 2019), enriquecida con oxígeno(Cacua et al., 2012; Granados et al., 2014, 2015; P. L. López, 2016; Sánchez et al., 2013)
Combustión en medio poroso	(C. E. Arrieta et al., 2017; Echeverri-Uribe & Amell, 2020; Iral & Amell, 2015)
Combustión con regeneración térmica	(A. Amell et al., 2007; A. M. García & Amell, 2018)
Combustión a presiones inferiores a la atmosférica	(Cano et al., 2019; Vargas et al., 2020)
Combustión de hidrógeno	(Burbano et al., 2008; Cardona-Vargas et al., 2020; Juan P. Gómez Montoya et al., 2018)
Combustión de gas de síntesis y biogás	(Carlos E. Arrieta & Amell-Arrieta, 2014; C. E. Arrieta, García, Yepes, et al., 2019; Cacua et al., 2011a, 2011b; Cano et al., 2019; M. J. P. Gómez et al., 2015; Juan P. Gómez Montoya et al., 2018; Juan Pablo Gómez Montoya et al., 2016, 2018; Juan Pablo Gómez Montoya & Amell-Arrieta, 2021; Yepes & Amell, 2013)
Combustión de biomasa	(Granados et al., 2021; Manrique et al., 2019)

Tabla 10S. Artículos en los cuales se aplican modelos de representación física a temas cercanos a los incendios como la combustión y la pirólisis como aplicación industrial

Descripción	**Referencia**
Modelo teórico de pirólisis	(Blanco & Chejne, 2016)
Análisis de dinámica de fluidos computacional (CFD) de procesos de combustión	(C. E. Arrieta, García, Cardona, et al., 2019; Bedoya et al., 2012; F. Cadavid et al., 2010; A. M. García et al., 2020; A. M. García & Amell, 2018; Granados et al., 2014; Herrera Múnera et al., 2009; Lezcano et al., 2013, 2017; Lopez & Molina, 2017; Y. López et al., 2020)
Análisis de algoritmos de CFD	(Guerrero et al., 2017; J. M. Mejía et al., 2015; Juan M. Mejía et al., 2016)

Tabla 11S. Trabajos de pregrado relacionados con simulación de incendios y explosiones

Descripción	**Referencia**
Uso de herramientas de modelación física para el análisis de explosiones	(Bayona-Alvernia, 2019; Cano Acosta, 2014; Salamanca-Zapata, 2012; Salazar Orozco, 2013)
Análisis de diseño por desempeño	(Cardoso Piñeros, 2020)

Tabla 12S. Investigaciones que involucran el tema radiación térmica relacionadas con investigadores colombianos

Descripción	**Referencia**
Ciencias básicas	(Oliveros et al., 2006; Rueda, 1973)
Hornos industriales	(Obando et al., 2015)
Llamas	(Suárez et al., 2011)
Radiación solar	(Chejne et al., 2011; Macía et al., 2005; Moreno-Gamboa et al., 2020)

Tabla 13S. Artículos relacionados con pirólisis, smoldering y la formación de hollín realizados por investigadores asociados con Colombia

Descripción	Referencia
Pirólisis de residuos agroindustriales y de otros materiales de deshecho	(C. N. Arenas et al., 2019; Blanco & Chejne, 2016; Brennan Pecha et al., 2019; Campuzano et al., 2019; Conesa et al., 2016; Garcia-Nunez et al., 2017; D. López et al., 2010; J. Montoya et al., 2016; J. Montoya, Pecha, Chejne Janna, et al., 2017a, 2017b, 2017c; J. Montoya, Pecha, Roman, et al., 2017; J. I. Montoya, Chejne-Janna, et al., 2015; J. I. Montoya, Valdés, et al., 2015; Moreno-Piraján & Giraldo, 2010, 2011; Ordonez-Loza et al., 2021; Osorio & Chejne, 2019; Pecha, Montoya, Chejne, et al., 2017; Pecha, Montoya, Ivory, et al., 2017; Pecha, Terrell, et al., 2017; Romero Millán et al., 2017; Saldarriaga et al., 2018; Valdés et al., 2016)
Pirólisis materiales de deshecho	(Jaramillo-Arango et al., 2016)
Pirólisis de carbón	(Jiménez et al., 2012; Valdés & Chejne, 2017, 2018a, 2018b; Valdés Renteria et al., 2018)
Procesos de secado y oxidación de alimentos a bajas temperaturas	(Alean, Chejne, Maya, et al., 2020; Alean, Chejne, Ramírez, et al., 2020; Alean et al., 2016; V. H. Borda-Yepes et al., 2019; Victor H. Borda-Yepes et al., 2019; Rojas S et al., 2020)
Combustión in situ para recobro de petróleo	(Bottia-Ramirez et al., 2017; Cañas et al., 2014; Dangon Molano et al., 2019; Diaz et al., 2018; Duque et al., 2018; Gil et al., 2015; Koh Yoo et al., 2020; Lopez & Molina, 2017; Navarro et al., 2016; Padilla et al., 2016, 2017a; Rodriguez & Palma-Bustamante, 2013)
Hollín como producto de combustión en motores	(Botero et al., 2016; Lapuerta et al., 2011; M. Salamanca, Agudelo, et al., 2012; M. Salamanca, Mondragón, Agudelo, & Santamaría, 2012; M. Salamanca, Mondragón, Agudelo, Benjumea, et al., 2012; M. Salamanca, Velásquez, et al., 2012; Santamaria et al., 2010; Valencia-López et al., 2019; Velásquez et al., 2013; Ye et al., 2016)

Tabla 14S. Investigación en análisis de riesgos que se presenta por parte de investigadores asociados con Colombia

Descripción	**Referencia**
Desastres tecnológicos que se originan por riesgos naturales (Natural hazard triggering technological disasters, Natech)	(Mesa-Gómez, Casal, & Muñoz, 2020; Mesa-Gómez, Casal, Sánchez-Silva, et al., 2020; Suarez-Paba et al., 2019, 2020)
terremotos, oleaje extremo, relámpagos y truenos, accidentes volcánicos, vientos y desplazamientos de tierra	(Alvarado-Franco et al., 2017; Bernal et al., 2017; Kabir et al., 2019; Olivar et al., 2020; Rangel-Buitrago et al., 2018; Salgado-Gálvez et al., 2014; Tovar et al., 2014)
Análisis enfocado en el riesgo ecológico	(Marrugo-Negrete et al., 2021; Ruiz-Guzmán et al., 2014; Yanes et al., 2019)

Tabla 15S. Investigaciones relacionadas con la aplicación de estrategias pedagógicas en el área de ingeniería

Tema	**Referencia**
Herramientas virtuales o de simulación física	(Barreto & Haydar, 2016; Buitrago et al., 2018; Jimenez Lopez et al., 2017; Metaute Paniagua et al., 2018; D. Montoya et al., 2020; Ramírez et al., 2020; Trefftz et al., 2010)
Educación basada en proyectos, en la solución de problemas o en servicios, el plan padrino, o el uso de juegos	(Contreras & Ruíz, 2015; Dueñas & Rincón, 2019; Feijóo-García & Ortíz-Buitrago, 2018; Metaute Paniagua et al., 2018; Ramírez et al., 2020; Rodríguez-Sandoval & Cortés-Rodriguez, 2010; Rozo-Rojas et al., 2018; Sáenz, 2021; Soto Ortiz et al., 2020; Zabala-Vargas et al., 2021)

REFERENCIAS MATERIAL SUPLEMENTARIO

1. Agudelo, J., Delgado, Á., & Benjumea, P. (2011). The lubricity of ethanol-gasoline fuel blends. *Revista de La Facultad de Ingeniería Universidad de Antioquia*, *58*, 9–16.
2. Aguilar R., L. A., & Echeverri, H. A. (1992). Riesgos de incendio y explosión en la industria química. *Revista CINTEX*, *2*, 63–66.
3. Alean, J., Chejne, F., Maya, J. C., Camargo-Trillos, D., Ramírez, S., Rincón, E., & Rojano, B. (2020). Evolution of the porous structure of cocoa beans during microwave drying. *Drying Technology*, *38*(10), 1313–1322.
4. Alean, J., Chejne, F., Ramírez, S., Rincón, E., Alzate-Arbelaez, A. F., & Rojano, B. (2020). Proposal of a method to evaluate the in-situ oxidation of polyphenolic during the cocoa drying. *Drying Technology*, 1–12.
5. Alean, J., Chejne, F., & Rojano, B. (2016). Degradation of polyphenols during the cocoa drying process. *Journal of Food Engineering*, *189*, 99–105.
6. Alvarado-Franco, J. P., Castro, D., Estrada, N., Caicedo, B., Sánchez-Silva, M., Camacho, L. A., & Muñoz, F. (2017). Quantitative-mechanistic model for assessing landslide probability and pipeline failure probability due to landslides. *Engineering Geology*, *222*, 212–224.
7. Alvarado, P. N., Cadavid S, F., Mondragon, F., & Ruiz, W. (2009). Chemical kinetic study of nitrogen oxides formation in methane flameless combustion. *Energetica (Medellin)*, *41*(1), 13–22.
8. Alvarado, P. N., Cardona, L. F., Santamaria, A., Amell, A. A., & Ruiz, W. (2017). Characterization of coal combustion in a hot and diluted environment using a

surface-stabilized gas natural flame. *Energy & Fuels: An American Chemical Society Journal*, *31*(4), 4479–4487.

9. Álvarez, A., Lapuerta, M., & Agudelo, J. R. (2019). Prediction of flash-point temperature of alcohol/biodiesel/diesel fuel blends. *Industrial & Engineering Chemistry Research*, *58*(16), 6860–6869.
10. Alvarez, J. E. M., & Giraldo, F. M. (2018). Comparison of Fire Extinguishing Approaches in Engine Control Rooms. In M. R. Eden, M. G. Ierapetritou, & G. P. Towler (Eds.), *Computer Aided Chemical Engineering* (Vol. 44, pp. 2317–2322). Elsevier.
11. Amador, G., Forero, J. D., Rincon, A., Fontalvo, A., Bula, A., Padilla, R. V., & Orozco, W. (2017). Characteristics of Auto-Ignition in Internal Combustion Engines Operated With Gaseous Fuels of Variable Methane Number. *Journal of Energy Resources Technology*, *139*(4). https://doi.org/10.1115/1.4036044
12. Amaya-Gómez, R., Bastidas-Arteaga, E., Schoefs, F., Muñoz, F., & Sánchez-Silva, M. (2020). A condition-based dynamic segmentation of large systems using a Changepoints algorithm: A corroding pipeline case. *Structural Safety*, *84*, 101912.
13. Amaya-Gómez, R., Dumar, V., Sánchez-Silva, M., Romero, R., Arbeláez, C., & Muñoz, F. (2019). Process safety part of the engineering education DNA. *Education for Chemical Engineers*, *27*, 43–53.
14. Amaya, R., Lozano, F., Parra, L., Suarez, M., & Muñoz, F. (2013). Database review for understanding current safety situation of pipeline incidents in

Colombia. *Bogotá: Departamento de Ingeniería Química, Universidad de Los Andes*.

15. Amell, A. A. (2007). Influence of altitude on the height of blue cone in a premixed flame. *Applied Thermal Engineering*, *27*(2), 408–412.
16. Amell, A. A., Yepes, H. A., & Cadavid, F. J. (2014). Numerical and experimental study on laminar burning velocity of syngas produced from biomass gasification in sub-atmospheric pressures. *International Journal of Hydrogen Energy*, *39*(16), 8797–8802.
17. Amell, A., Copete, H., & Cadavid, F. (2007). Development and evaluation of an autoregenerative and radiant combustion system for high temperature process in SME. *Dyna*, *74*(151), 61–69.
18. Amin, M., Murillo, C. H., Torrado, D. E., Pico, P., Serrano, J., Dufaud, O., & Muñoz, F. (2018, April 23). Influence of the particle size distribution on the dispersion process of combustible dusts in the 20 L sphere. *2018 Spring Meeting and 14th Global Congress on Process Safety*. https://aiche.confex.com/aiche/s18/meetingapp.cgi/Paper/511247
19. Arenas, C. N., Navarro, M. V., & Martínez, J. D. (2019). Pyrolysis kinetics of biomass wastes using isoconversional methods and the distributed activation energy model. *Bioresource Technology*, *288*, 121485.
20. Arenas, É., & Chejne, F. (2004). The effect of the activating agent and temperature on the porosity development of physically activated coal chars. *Carbon*, *42*(12), 2451–2455.

21. Arias, S., Molina, F., & Agudelo, J. R. (2021). Palm oil biodiesel: An assessment of PAH emissions, oxidative potential and ecotoxicity of particulate matter. *Journal of Environmental Sciences* , *101*, 326–338.
22. Armenteras-Pascual, D., Retana-Alumbreros, J., Molowny-Horas, R., Roman-Cuesta, R. M., Gonzalez-Alonso, F., & Morales-Rivas, M. (2011). Characterising fire spatial pattern interactions with climate and vegetation in Colombia. *Agricultural and Forest Meteorology*, *151*(3), 279–289.
23. Arrieta, C. E., & Amell-Arrieta, A. A. (2014). Highly flexible burner concept for research on combustion technologies with recirculation of hot combustion products. *Applied Thermal Engineering*, *63*(2), 559–564.
24. Arrieta, C. E., & Amell-Arrieta, A. A. (2014). Combustion analysis of an equimolar mixture of methane and syngas in a surface-stabilized combustion burner for household appliances. *Fuel*, *137*, 11–20.
25. Arrieta, C. E., García, A., Cardona, A., Bedoya, I., & Amell-Arrieta, A. A. (2019). Numerical simulation of the combustion stability of natural gas and syngas in a surface-stabilized combustion burner. *Journal of Physics: Conference Series*, *1409*, 012017.
26. Arrieta, C. E., García, A. M., & Amell-Arrieta, A. A. (2017). Experimental study of the combustion of natural gas and high-hydrogen content syngases in a radiant porous media burner. *International Journal of Hydrogen Energy*, *42*(17), 12669–12680.
27. Arrieta, C. E., García, A., Yepes, H. A., Bedoya, I., & Amell-Arrieta, A. A. (2019). An experimental study of combustion stability and emissions characteristics of a

surface-stabilized combustion burner fueled with natural gas-syngas blends. *Journal of Physics: Conference Series*, *1257*, 012018.

28. Ávila, C. D., Botero, M. L., Agudelo, A. F., & Agudelo, J. R. (2021). An assessment on how different collection methods impact thermal properties, surface functional groups, nanostructure and morphology of diesel particulate matter. *Combustion and Flame*, *225*, 74–85.
29. Baalisampang, T., Abbassi, R., Garaniya, V., Khan, F., & Dadashzadeh, M. (2018). Review and analysis of fire and explosion accidents in maritime transportation. *Ocean Engineering*, *158*, 350–366.
30. Baldrich, C., & Novoa, L. (2006). Rapid characterization of diesel fuel by infrared spectroscopy. *CT&F-Ciencia, Tecnología Y Futuro*. http://www.scielo.org.co/scielo.php?script=sci_arttext&pid=S0122-53832006000200013
31. Baldrich Ferrer, C. A., & Novoa Mantilla, L. Á. (2007). Detailed chemical characterization of petroleum middle fractions by chemometrics analysis of their ultraviolet spectrum. *CT&F-Ciencia, Tecnología Y*, *3*(3), 173–190.
32. Barreto, C. R., & Haydar, J. M. (2016). Pedagogical intercultural practice of teachers in virtual environments. *Turkish Online Journal of Distance Education*, *17*(4), 13.
33. Bayona-Alvernia, D. U. (2019). *Actualización de la ingeniería del sistema de protección contra incendios de u a planta de separación y almacenamiento de petróleo ubicada en el noreste colombiano* (E. Espinel-Blanco (ed.)) [Ingeniería

Mecánica, Universidad Francisco de Paula]. http://repositorio.ufpso.edu.co/jspui/handle/123456789/2290

34. Bedoya, I. D., Cadavid, F., Saxena, S., Dibble, R., Aceves, S., & Flowers, D. (2012). A Sequential Chemical Kinetics-CFD-Chemical Kinetics Methodology to Predict HCCI Combustion and Main Emissions. In SAE International (Ed.), *SAE 2012 World Congress & Exhibition* (No. 2012-01-1119; pp. 2012–01 – 1119). SAE Technical Paper.
35. Benjumea, P., Agudelo, J., & Agudelo, A. (2008). Basic properties of palm oil biodiesel–diesel blends. *Fuel*, *87*(10), 2069–2075.
36. Benjumea, P., Agudelo, J. R., & Agudelo, A. F. (2011). Effect of the Degree of Unsaturation of Biodiesel Fuels on Engine Performance, Combustion Characteristics, and Emissions. *Energy & Fuels: An American Chemical Society Journal*, *25*(1), 77–85.
37. Bermejo, F. A., & Orozco, W. A. (2013). Development of a Methodology for the Conversion of Truck Diesel Engines to Biogas Operation for Electricity Generation in Farm Zones of Colombia. *ASME 2012 International Mechanical Engineering Congress and Exposition*, 959–966.
38. Bernal, G. A., Salgado-Gálvez, M. A., Zuloaga, D., Tristancho, J., González, D., & Cardona, O.-D. (2017). Integration of Probabilistic and Multi-Hazard Risk Assessment Within Urban Development Planning and Emergency Preparedness and Response: Application to Manizales, Colombia. *International Journal of Disaster Risk Science*, *8*(3), 270–283.

39. Blanco, A., & Chejne, F. (2016). Modeling and simulation of biomass fast pyrolysis in a fluidized bed reactor. *Journal of Analytical and Applied Pyrolysis*, *118*, 105–114.
40. Blandon, A., Parra, N., Gorin, G. E., & Arango, F. (2008). Adapting palynological preparation methods in subbituminous and bituminous coals from Colombia to improve palynofacies and hydrocarbon source rock evaluations. *International Journal of Coal Geology*, *73*(2), 99–114.
41. Borda-Yepes, V. H., Chejne, F., Daza-Olivella, L. V., Alzate-Arbelaez, A. F., Rojano, B. A., & Raghavan, V. G. S. (2019). Effect of microwave and infrared drying over polyphenol content in Vaccinium meridionale (Swartz) dry leaves. *Journal of Food Process Engineering*, *42*(1), e12939.
42. Borda-Yepes, V. H., Chejne, F., Granados, D. A., Rojano, B., & Raghavan, V. S. G. (2019). Mathematical particle model for microwave drying of leaves. *Heat and Mass Transfer*, *55*(10), 2959–2974.
43. Botero, M. L., Akroyd, J., Chen, D., Kraft, M., & Agudelo, J. R. (2021). On the thermophoretic sampling and TEM-based characterisation of soot particles in flames. *Carbon*, *171*, 711–722.
44. Botero, M. L., Chen, D., González-Calera, S., Jefferson, D., & Kraft, M. (2016). HRTEM evaluation of soot particles produced by the non-premixed combustion of liquid fuels. *Carbon*, *96*, 459–473.
45. Botero, M. L., Mendoza, C., Arias, S., Hincapié, O. D., Agudelo, J. R., & Ortiz, I. C. (2020). In vitro evaluation of the cytotoxicity, mutagenicity and DNA damage induced by particle matter and gaseous emissions from a medium-duty diesel

vehicle under real driving conditions using palm oil biodiesel blends. In *Environmental Pollution* (Vol. 265, p. 115034). https://doi.org/10.1016/j.envpol.2020.115034

46. Bottia-Ramirez, H., Aguillon-Macea, M., Lizcano-Rubio, H., Delgadillo-Aya, C. L., & Gadelle, C. (2017). Numerical modeling on in-situ combustion process in the Chichimene field: Ignition stage. *Journal of Petroleum Science & Engineering*, *154*, 462–468.
47. Bradley, P. L., & Baxter, A. (2002). Fires, explosions and related incidents at work in Great Britain in 1998/1999 and 1999/2000. *Journal of Loss Prevention in the Process Industries*, *15*(5), 365–372.
48. Brennan Pecha, M., Arbelaez, J. I. M., Garcia-Perez, M., Chejne, F., & Ciesielski, P. N. (2019). Progress in understanding the four dominant intra-particle phenomena of lignocellulose pyrolysis: chemical reactions, heat transfer, mass transfer, and phase change. *Green Chemistry: An International Journal and Green Chemistry Resource: GC*, *21*(11), 2868–2898.
49. Buitrago, P., Camacho, R., Orduña, P., Villar, A., Rodríguez-Gil, L., Angulo, I., & García-Zubío, J. (2018). Use of Remote Laboratories in Engineering as an Alternative to Pedagogical Mediation and Social Inclusion in Distance Education. *2018 Congreso Internacional de Innovación Y Tendencias En Ingeniería (CONIITI)*, 1–6.
50. Burbano, H. J., Amell, A. A., & García, J. M. (2008). Effects of hydrogen addition to methane on the flame structure and CO emissions in atmospheric burners. *International Journal of Hydrogen Energy*, *33*(13), 3410–3415.

51. Burbano, H. J., Pareja, J., & Amell, A. A. (2011a). Laminar burning velocities and flame stability analysis of H2/CO/air mixtures with dilution of N2 and CO2. *International Journal of Hydrogen Energy*, *36*(4), 3232–3242.
52. Burbano, H. J., Pareja, J., & Amell, A. A. (2011b). Laminar burning velocities and flame stability analysis of syngas mixtures at sub-atmospheric pressures. *International Journal of Hydrogen Energy*, *36*(4), 3243–3252.
53. Bustamante-Rúa, M. O., Bustamante Baena, P., & Daza Aragón, A. J. (2018). Optimization of techniques for the extinction and prevention of coal fires produced in final walls as a result of spontaneous combustion in the Cerrejón mine—Colombia. *Environmental Science and Pollution Research*, *25*(32), 32515–32523.
54. Bustamante-Rúa, M. O., Daza-Aragón, A. J., & Bustamante-Baena, P. (2019). A study of fire propagation in coal seam with numerical simulation of heat transfer and chemical reaction rate in mining field. *International Journal of Rock Mechanics and Mining Sciences*, *29*(6), 873–879.
55. Bustamante-Rúa, M. O., Daza Aragón, A. J., Bustamante Baena, P., & Osorio Botero, J. D. (2019). Statistical analysis to establish an ignition scenario based on extrinsic and intrinsic variables of coal seams that affect spontaneous combustion. *International Journal of Mining Science and Technology*, *29*(5), 731–737.
56. Cacua, K., Amell-Arrieta, A. A., & Cadavid, F. (2012). Effects of oxygen enriched air on the operation and performance of a diesel-biogas dual fuel engine. *Biomass and Bioenergy*, *45*, 159–167.

57. Cacua, K., Amell-Arrieta, A. A., & Olmos, L. (2011a). A comparative study of the com-combustion properties of normal bio-bustion biogas gas gas-air mixture and oxygen oxygen-enriched biogas biogas-air. *Ingeniería E Investigación*, *31*(1), 233–241.
58. Cacua, K., Amell-Arrieta, A. A., & Olmos, L. (2011b). Estudio comparativo entre las propiedades de combustión de la mezcla biogás-aire normal y biogás-aire enriquecido con oxígeno. *Ingenieria E Investigación*. https://www.redalyc.org/pdf/643/64321170025.pdf
59. Cadavid, F., Herrera, B., & Amell, A. (2010). Numerical simulation of the flow streams behavior in a self-regenerative crucible furnace. *Applied Thermal Engineering*, *30*(8), 826–832.
60. Cadavid, Y., & Amell, A. (2019). The effect of natural gas composition and atmospheric humidity on premixed combustion across the regions of Colombia. *Thermal Science and Engineering Progress*, *10*, 198–207.
61. Cadrazco, M., Santamaría, A., & Agudelo, J. R. (2019). Chemical and nanostructural characteristics of the particulate matter produced by renewable diesel fuel in an automotive diesel engine. *Combustion and Flame*, *203*, 130–142.
62. Cadrazco, M., Santamaría, A., Jaramillo, I. C., Kaur, K., Kelly, K. E., & Agudelo, J. R. (2020). Characterization of renewable diesel particulate matter gathered from non-premixed and partially premixed flame burners and from a diesel engine. *Combustion and Flame*, *214*, 65–79.

63. Cala, O. M., Stand, L. M., Kafarov, V., & Rueda, J. S. (2013). Efecto de la composición del gas de refinería sobre las características del proceso de combustión. *Revista Ingenierías Universidad de Medellín*, *12*(23), 101–111.
64. Calderón, L. A., Garza, J., & Espinal, J. F. (2015). Theoretical Study of Sodium Effect on the Gasification of Carbonaceous Materials with Carbon Dioxide. *The Journal of Physical Chemistry. A*, *119*(51), 12756–12766.
65. Cal Poly - College of Engineering. (2021). *MS Fire Protection Engineering*. Cal Poly. https://catalog.calpoly.edu/collegesandprograms/collegeofengineering/msfireprotectionengineering/
66. Campuzano, F., Brown, R. C., & Martínez, J. D. (2019). Auger reactors for pyrolysis of biomass and wastes. *Renewable and Sustainable Energy Reviews*, *102*, 372–409.
67. Cañas, M. C. R., Ramirez, H. B., & Navarro, S. F. M. (2014). Cinética de procesos de combustión in situ: Una discusión de los modelos cinéticos. *Revista fuentes el reventón energético*, *12*(1), 1.
68. Cano Acosta, N. A. (2014). *Comparación de los programas FLACS, PHAST y ANSYS en el cálculo del riesgo individual para ductos de transporte de gas natural* (F. Muñoz & N. Rios-Ratkovich (eds.)) [Chemical Engineering, Uniandes]. https://repositorio.uniandes.edu.co/bitstream/handle/1992/19550/u670841.pdf?sequence=1
69. Cano, F., Arrieta, C. E., Yepes, H. A., & Amell-Arrieta, A. A. (2019). Experimental study of turbulent syngas/methane/air flames at a sub-atmospheric condition.

Journal of Physics. https://iopscience.iop.org/article/10.1088/1742-6596/1409/1/012012/meta

70. Cardona, C., Amell, A., & Burbano, H. (2013). Laminar burning velocity of natural gas/syngas-air mixture. *Dynamic Medicine: DM*, *80*(180), 136–143.
71. Cardona Medina, C. A., Amell-Arrieta, A. A., & Burbano, H. (2013). Laminar burning velocity of natural gas/syngas-air mixture. *Dyna*, *80*(180), 136–143.
72. Cardona Vargas, A., & Amell-Arrieta Andrés Adolfo Arrieta Carlos. (2016). Combustion characteristics of several typical shale gas mixtures. *Journal of Natural Gas Science and Engineering*, *33*, 296–304.
73. Cardona-Vargas, A., Valencia, D., Arrieta, C. E., & Amell-Arrieta, A. A. (2020). Combustion of a hydrogen/carbon monoxide/carbon dioxide mixture in hot and diluted streams. *Journal of Physics. Conference Series*, *1708*, 012013.
74. Cardoso Piñeros, A. F. (2020). *Simulación del fuego, caso puentes simplemente apoyados placa viga* (J. A. Pulecio Díaz (ed.)) [Ingeniería Civil, Universidad Cooperativa de Colombia, Campus Ibagué Espinal]. https://repository.ucc.edu.co/handle/20.500.12494/28244
75. Castellanos-Vargas, A. (2018). *A methodology for the assessment of domino effect scenarios due to projection of fragments generated by internal explosions of spherical vessels* (F. Muñoz-Giraldo, J. M. Gómez-Ramírez, & E. A. Marañón-León (eds.)) [Maestría en Ingeniería Química]. https://repositorio.uniandes.edu.co/handle/1992/13583

76. Chejne, F., Macía, A., Estrada, D., Velásquez, H. I., & Londoño, C. (2011). Radiation model for predicting temperature evolution in solar cooker. *Dyna*, *78*(166), 68–74.
77. Collins, B. M., Miller, J. D., Knapp, E. E., & Sapsis, D. B. (2019). A quantitative comparison of forest fires in central and northern California under early (1911–1924) and contemporary (2002–2015) fire suppression. *International Journal of Wildland Fire*, *28*(2), 138–148.
78. Colorado, A. F., Herrera, B. A., & Amell, A. A. (2010). Performance of a flameless combustion furnace using biogas and natural gas. *Bioresource Technology*, *101*(7), 2443–2449.
79. Conesa, J. A., Sánchez, N. E., Garrido, M. A., & Casas, J. C. (2016). Semivolatile and Volatile Compound Evolution during Pyrolysis and Combustion of Colombian Coffee Husk. *Energy & Fuels: An American Chemical Society Journal*, *30*(10), 7827–7833.
80. Contreras, O. E., & Ruíz, E. T. (2015). Pedagogical innovation: Key driver for the educational process of future industrial engineers — the case of industrial university of Santander (UIS), Colombia. *International Journal of Information and Education Technology (IJIET)*, *5*(3), 220–227.
81. Dangon Molano, J., Mora Uribe, S., Muñoz N., S., Padilla R, J., & Bottía Ramirez, H. (2019). Efecto de la saturación de agua durante la ignición de un proceso de combustión in situ. *Revista Ion Investigación Optimización y Nuevos procesos en Ingeniería*, *31*(2), 83–97.

82. Diaz, A. R. P., Acevedo, Y. H. P., Reyes, J. M. P., & Navarro, S. F. M. (2018). Aplicación de una alternativa simplificada para modelar la cinética de un proceso de combustión in situ. *Fuentes, El Reventón Energético*, *16*(2). https://revistas.uis.edu.co/index.php/revistafuentes/article/view/9166
83. Díez, H. E., & Pérez, J. F. (2017). Physicochemical Characterization of Representative Firewood Species Used for Cooking in Some Colombian Regions. In *International Journal of Chemical Engineering* (Vol. 2017, pp. 1–13). https://doi.org/10.1155/2017/4531686
84. DNBC Dirección Nacional Bomberos de Colombia. (2021). *Eventos Atendidos por Bomberos Colombia*. DNBC Dirección Nacional Bomberos de Colombia. https://bomberos.mininterior.gov.co/sala-de-prensa/noticias/eventos-atendidos-por-bomberos-colombia
85. Duarte, J., Amador, G., Garcia, J., Fontalvo, A., Vasquez Padilla, R., Sanjuan, M., & Gonzalez Quiroga, A. (2014). Auto-ignition control in turbocharged internal combustion engines operating with gaseous fuels. *Energy*, *71*, 137–147.
86. Dueñas, W. R. R., & Rincón, A. M. R. (2019). Interdisciplinary Work as a Pedagogical Innovation for Biomedical Engineering and Health Science Students. *World Congress on Medical Physics and Biomedical Engineering 2018*, 855–858.
87. Duque, J. E., López, S., & Molina, A. (2018). Development of a tunable diode laser sensor for CO concentration analysis at laboratory-scale conditions for in situ combustion tests of heavy crude oils. *Applied Optics*, *57*(23), 6707–6716.

88. Echavarría, J. D., & Amell, A. A. (2017). Study of the flameless combustión mode in presence of the thermal load fluctuation. *Ingeniería Y Ciencia*. http://www.scielo.org.co/scielo.php?script=sci_arttext&pid=S1794-91652017000100185
89. Echeverri-Uribe, C., & Amell, A. A. (2020). Experimental Evaluation of the Surface-Stabilized Combustion of a Confined Porous Inert Media Burner. *Combustion Science and Technology*, *192*(2), 335–358.
90. Escuela de Medicina y Ciencias de la Salud-Universidad del Rosario. (2021). *Especialización en Salud ocupacional - Universidad del Rosario*. Universidad Del Rosario. https://www.urosario.edu.co/Escuela-de-Medicina/Especializacion-en-Salud-Ocupacional/Inicio/
91. Espinal, J. F., Mondragón, F., & Truong, T. N. (2004). Density functional theory study of carbon-H2O reactions during gasification with steam. *Prepr. Pap.-Am. Chem. Soc., Div*. http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.470.9689&rep=rep1&type=pdf
92. Espinal, J. F., Mondragón, F., & Truong, T. N. (2005). Mechanisms for methane and ethane formation in the reaction of hydrogen with carbonaceous materials. *Carbon*, *43*(9), 1820–1827.
93. Espinal, J. F., Montoya, A., Mondragón, F., & Truong, T. N. (2004). A DFT Study of Interaction of Carbon Monoxide with Carbonaceous Materials. *The Journal of Physical Chemistry. B*, *108*(3), 1003–1008.

94. Espinal, J. F., Truong, T. N., & Mondragón, F. (2007). Mechanisms of NH3 formation during the reaction of H2 with nitrogen containing carbonaceous materials. *Carbon*, *45*(11), 2273–2279.
95. Facultad de Minas-Universidad Nacional de Colombia. (2021). *Especialización Ingeniería Contra Incendios y Explosiones*. Universidad Nacional de Colombia. http://www.legal.unal.edu.co/rlunal/home/doc.jsp?d_i=97107
96. Facultad Nacional de Salud Pública - Universidad de Antioquia. (2021). *Especialización en Seguridad y Salud en el Trabajo*. Universidad de Antioquia. http://udea.edu.co/wps/portal/udea/web/inicio/unidades-academicas/salud-publica/estudiar-facultad/posgrados/especializacion-seguridad-salud-trabajo
97. Faculty of Engineering, Lund University. (2021). *Fire Safety Engineering (M.Sc.)*. Lund University. https://www.lunduniversity.lu.se/lucat/group/v1000293
98. Feijóo-García, P. G., & Ortíz-Buitrago, C. H. (2018). The Godparent Plan: A pedagogical strategy for CS1 accompaniment and CS2 pedagogical enhancement. *International Journal of Engineering Pedagogy (iJEP)*, *8*(1), 43.
99. Fernando, H. R. (2017). *Diagnóstico integral de las condiciones de trabajo y salud*. Ecoe Ediciones.
100. Forigua, J., & Lyons, L. (2016). Safety Analysis of Transportation Chain for Dangerous Goods: A Case Study in Colombia. *Transportation Research Procedia*, *12*, 842–850.
101. Forshungszentrum Jülich. (2020). *Forschungszentrum Jülich - Fire Dynamics*. Institute for Advanced Simulation (IAS). https://www.fz-juelich.de/ias/ias-7/EN/Research/Fire_Dynamics/_node.html

102. Fuentes, R., Molina, J., & Blandón, A. (2018). Explosive Parameters for Coal Samples (Antioquia, Colombia). *Revista Ingenierías Universidad de Medellín*, *17*(33), 19–38.

103. García, A. M., & Amell, A. A. (2018). A numerical analysis of the effect of heat recovery burners on the heat transfer and billet heating characteristics in a walking-beam type reheating furnace. *International Journal of Heat and Mass Transfer*, *127, Part B*, 1208–1222.

104. García, A. M., Rendon, M. A., & Amell, A. A. (2020). Combustion model evaluation in a CFD simulation of a radiant-tube burner. *Fuel*, *276*, 118013.

105. García, D., Lapuerta, M., Villa, A. L., Alarcón, E., & Bustamante, F. (2020). Influence of molecular structure of oleoresin-derived compounds on flame properties and emissions from laminar flames. *Environmental Science and Pollution Research International*, *27*(27), 33890–33902.

106. Garcia-Nunez, J. A., Pelaez-Samaniego, M. R., Garcia-Perez, M. E., Fonts, I., Abrego, J., Westerhof, R. J. M., & Garcia-Perez, M. (2017). Historical Developments of Pyrolysis Reactors: A Review. *Energy & Fuels: An American Chemical Society Journal*, *31*(6), 5751–5775.

107. Garcia-Torrent, J., Fernandez-Anez, N., Medic-Pejic, L., Blandon-Montes, A., & Molina-Escobar, J. M. (2016). Ignition and explosion parameters of Colombian coals. *Journal of Loss Prevention in the Process Industries*, *43*, 706–713.

108. Gaviria, L. R., Uribe, C. E., Tumay, H. Y., & Amell-Arrieta, A. A. (2014). Estudio teórico y experimental de la velocidad de deflagración laminar de una

mezcla glp/gas de síntesis. *Ingenius: Revista de Ciencia Y Tecnología*, *12*, 62–67.

109. Ghent University. (2021). *Ghent University: Master of Science in Fire Safety Engineering*. Ghent University. https://studiekiezer.ugent.be/master-of-science-in-fire-safety-engineering-en/2021

110. Ghent University, Lund University, The University of Edinburgh, ETH Zürich, The University of Queensland Australia, & The University of Maryland. (2021). *International Master of Science in Fire Safety Engineering*. International Master of Science in Fire Safety Engineering. https://imfse.be/

111. GIG Research Institute. (2021). *Experimental Mine BARBARA*. GIG Research Institute. https://gig.eu/en/experimental-mine-barbara

112. Gil, E., Quintero, N. M., Rojas, L. A., Fuenmayor, M., & Farouq Ali, S. (2015, June 9). Monitoring and optimization of an in-situ combustion pilot applying STAR™ technology. *All Days*. SPE Canada Heavy Oil Technical Conference, Calgary, Alberta, Canada. https://doi.org/10.2118/174435-ms

113. Gómez-Meyer, J. S., Gollahalli, S. R., Parthasarath, R. N., & Quiroga, J. E. (2012). Laminar flame speed of soy and canola biofuels. *CT&F - Ciencia, Tecnología Y Futuro*, *4*(5), 75–83.

114. Gómez, M. J. P., Amell, A. A. A., & Zapata, L. J. F. (2015). Spark ignition engine performance and emissions in a high compression engine using biogas and methane mixtures without knock occurrence. *Thermal Science*, *19*(6), 1919–1930.

115. Gómez Montoya, J. P., Amell, A. A., & Olsen, D. B. (2016). Prediction and measurement of the critical compression ratio and methane number for blends of biogas with methane, propane and hydrogen. *Fuel*, *186*, 168–175.

116. Gómez Montoya, J. P., Amell, A. A., Olsen, D. B., & Amador Diaz, G. J. (2018). Strategies to improve the performance of a spark ignition engine using fuel blends of biogas with natural gas, propane and hydrogen. *International Journal of Hydrogen Energy*, *43*(46), 21592–21602.

117. Gómez Montoya, J. P., & Amell-Arrieta, A. A. (2021). Phenomenological Analysis of the Combustion of Gaseous Fuels to Measure the Energy Quality and the Capacity to Produce Work in Spark Ignition Engines. *Journal of Engineering for Gas Turbines and Power*, *143*(5), 051016.

118. Gómez Montoya, J. P., Olsen, D. B., & Amell, A. A. (2018). Engine operation just above and below the knocking threshold, using a blend of biogas and natural gas. *Energy*, *153*, 719–725.

119. Gómez, S., Guerra, D., López, J. G., Toro-Labbé, A., & Restrepo, A. (2013). A detailed look at the reaction mechanisms of substituted carbenes with water. *The Journal of Physical Chemistry. A*, *117*(9), 1991–1999.

120. González Delgado, Á. D. (2019). Evaluación HIRA asistida por computador de peligros potenciales en la producción de aceite de palma crudo. *Revista Palmas*, *40*(Especial T), 56–66.

121. GOV UK. (2016). *Fire statistics*. GOV.UK; GOV.UK. https://www.gov.uk/government/collections/fire-statistics

122. Granados, D. A., Basu, P., Nhuchhen, D. R., & Chejne, F. (2021). Investigation into torrefaction kinetics of biomass and combustion behaviors of raw, torrefied and char samples. *Biofuels*, *12*(6), 633–643.

123. Granados, D. A., Chejne, F., & Mejía, J. M. (2015). Oxy-fuel combustion as an alternative for increasing lime production in rotary kilns. *Applied Energy*, *158*, 107–117.

124. Granados, D. A., Chejne, F., Mejía, J. M., Gómez, C. A., Berrío, A., & Jurado, W. J. (2014). Effect of flue gas recirculation during oxy-fuel combustion in a rotary cement kiln. *Energy*, *64*, 615–625.

125. Guerrero, E., Muñoz, F., & Ratkovich, N. (2017). Comparison between Eulerian and VOF models for two-phase flow assessment in vertical pipes. *CT&F-Ciencia, Tecnología Y*. http://www.scielo.org.co/scielo.php?pid=S0122-53832017000200073&script=sci_arttext&tlng=en

126. Gutiérrez Velásquez, E. I., Coronado, C. J. R., Quintero Cartagena, J. G., Carvalho, J. A., Mendiburu, A. Z., Andrade, J. C., Cortez, E. V., & Santos, J. C. (2017). Prediction of flammability limits for ethanol-air blends by the Kriging regression model and response surfaces. *Fuel*, *210*, 410–424.

127. Hall, J. R., & Harwood, B. (1989). The national estimates approach to U.S. fire statistics. *Fire Technology*, *25*(2), 99–113.

128. Herrera Múnera, B. A., Amell-Arrieta, A. A., & Cadavid Sierra, F. J. (2009). Numerical models for the phenomenological study of flameless combustion. *Ingeniería E Investigación*, *29*(2), 70–76.

129. Institut P'. (2019, September 2). *Heterogeneous Combustion and Porous Media – CH*. Institut P'. https://pprime.fr/en/research/fluids-thermal-and-combustion/heterogeneous-combustion-and-porous-media-ch/

130. Iral, L., & Amell, A. (2015). Performance study of an induced air porous radiant burner for household applications at high altitude. *Applied Thermal Engineering*, *83*, 31–39.

131. Jaramillo-Arango, A., Fonts, I., Chejne, F., & Arauzo, J. (2016). Product compositions from sewage sludge pyrolysis in a fluidized bed and correlations with temperature. *Journal of Analytical and Applied Pyrolysis*, *121*, 287–296.

132. Jaramillo-Urrego, L. M. (2019). *Safety in small-scale underground coal mining in Colombia* (N. A. Sifferlinger (ed.)) [Master, Mining Engineering and Mineral Economics]. https://pure.unileoben.ac.at/portal/files/4012401/AC15412409n01.pdf

133. Jaramillo-Urrego, L. M., Molina-Escobar, J. M., García-Torrent, J., & Medic-Pejic, L. (2017). Implementación de las normas ATEX en el contexto de la actividad minera en Colombia. *Revista Facultad de Ingeniería*, *26*(45), 47–60.

134. Jiménez, F., Mondragón, F., & López, D. (2012). Structural changes in coal chars after pressurized pyrolysis. *Journal of Analytical and Applied Pyrolysis*, *95*, 164–170.

135. Jimenez Lopez, F. R., Ardila Barragan, M. A., & Ruge Ruge, I. A. (2017). Análisis de las Propiedades Plásticas del Carbón mediante Instrumentación Virtual. *Proceedings of the 15th LACCEI International Multi-Conference for Engineering, Education, and Technology: "Global Partnership for Development*

and Engineering Education." The 15th LACCEI International Multi-Conference for Engineering, Education, and Technology: "Global Partnership for Development and Engineering Education." https://doi.org/10.18687/laccei2017.1.1.383

136. Jimenez-Orozco, C., Mondragón, F., & Espinal, J. F. (2018). Experimental and Computational Analysis of the Formation of Surface Oxygen Functional Groups during Iron Catalyzed Char Gasification with CO2. *Combustion Science and Technology*, *190*(4), 687–706.

137. Johnson-Restrepo, B., Olivero-Verbel, J., Lu, S., Guette-Fernández, J., Baldiris-Avila, R., O'Byrne-Hoyos, I., Aldous, K. M., Addink, R., & Kannan, K. (2008). Polycyclic aromatic hydrocarbons and their hydroxylated metabolites in fish bile and sediments from coastal waters of Colombia. *Environmental Pollution* , *151*(3), 452–459.

138. Jung, S., Woo, J., & Kang, C. (2020). Analysis of severe industrial accidents caused by hazardous chemicals in South Korea from January 2008 to June 2018. *Safety Science*, *124*, 104580.

139. Kabir, G., Suda, H., Cruz, A. M., Giraldo, F. M., & Tesfamariam, S. (2019). Earthquake-related Natech risk assessment using a Bayesian belief network model. *Structure and Infrastructure Engineering: Maintenance, Management, Life-Cycle Design and Performance*, *15*(6), 725–739.

140. Karlsruher Institut für Technologie. (2020). *Forschungsstelle für Brandschutztechnik*. Karlsruher Instutut für Technologie; Karlsruher Instutut für Technologie. http://www.ffb.kit.edu/

141. Khan, F. I., & Abbasi, S. A. (1999). Major accidents in process industries and an analysis of causes and consequences. *Journal of Loss Prevention in the Process Industries*, *12*(5), 361–378.

142. Kobayashi, Y. (2017). Frequency of ignition of non-residential buildings in Japan. *Fire Safety Journal*, *91*, 1035–1043.

143. Koh Yoo, K. H., Trujillo Portillo, M. L., Ramirez, C. P., Bittencourt Sampaio, L. E., Gerritsen, M., & Kovscek, A. R. (2020). Effect of Pressure on Crude-Oil Kinetics During In Situ Combustion. *Energy & Fuels: An American Chemical Society Journal*, *34*(10), 12103–12117.

144. Laboratorio Oficial “José María de Madariaga” (LOM). (2021). *Laboratorio Oficial “José María de Madariaga” (LOM)*. Laboratorio Oficial “José María de Madariaga” (LOM). http://www.lom.upm.es/

145. Lapuerta, M., Oliva, F., Agudelo, J. R., & Stitt, J. P. (2011). Optimization of Raman Spectroscopy Parameters for Characterizing Soot from Different Diesel Fuels. *Combustion Science and Technology*, *183*(11), 1203–1220.

146. Larry Grayson, R., Kinilakodi, H., & Kecojevic, V. (2009). Pilot sample risk analysis for underground coal mine fires and explosions using MSHA citation data. *Safety Science*, *47*(10), 1371–1378.

147. León, A.-Y., Guzmán M, A., Picón, H., Laverde C, D., & Molina, D., V. (2020). Reactivity of vacuum residues by thermogravimetric analysis and nuclear magnetic resonance spectroscopy. *Energy & Fuels: An American Chemical Society Journal*, *34*(8), 9231–9242.

148. Lezcano, C., Amell, A., & Cadavid, F. (2013). Numerical calculation of the recirculation factor in flameless furnaces. *Dyna*, *80*(180), 144–151.

149. Lezcano, C., Obando, J., & Amell, A. (2017). Numerical Simulation of a Flameless Combustion Furnace with Mixtures of Methane and a Sub-Bituminous Pulverized Coal. *Combustion Science and Technology*, *189*(9), 1591–1604.

150. Liu, Q., Shan, Y., Shu, L., Sun, P., & Du, S. (2018). Spatial and temporal distribution of forest fire frequency and forest area burnt in Jilin Province, Northeast China. In *Journal of Forestry Research* (Vol. 29, Issue 5, pp. 1233–1239). https://doi.org/10.1007/s11676-018-0605-x

151. Liu, Y., Geier, M., Molina, A., & Shaddix, C. R. (2011). Pulverized coal stream ignition delay under conventional and oxy-fuel combustion conditions. *International Journal of Greenhouse Gas Control*, *5*, S36–S46.

152. Londoño, L. F., López, C. E., Cadavid, F., & Burbano, H. (2013). Determination of laminar flame speed of methane-air flames at subatmospheric conditions using the cone method and CH* emission. *Dyna*, *80*(180), 130–135.

153. López, D., Acelas, N., & Mondragón, F. (2010). Average structural analysis of tar obtained from pyrolysis of wood. *Bioresource Technology*, *101*(7), 2458–2465.

154. López-Pérez, L. C. (2016). *Kinetic mechanism for the cracking of Colombian heavy crude oil in refinery equipments* (A. Molina (ed.)) [M.Sc. Ingeniería Química, Universidad Nacional de Colombia - Sede Medellín]. https://repositorio.unal.edu.co/handle/unal/56569

155. López, P. L. (2016). Comparación de los perfiles y parámetros de combustión y Oxi-Combustión para la cascarilla de arroz. *Energy*, *47*, 16–22.

156. Lopez, S., & Molina, A. (2017). Criteria To Select Operational Variables That Improve the Accuracy of the Evaluation of Kinetic Parameters in a Kinetic Cell Used in the Study of In Situ Combustion. *Energy & Fuels: An American Chemical Society Journal*, *31*(3), 2390–2397.

157. López, Y., García, A. M., & Amell, A. A. (2020). A Numerical Analysis of the Effect of Atmospheric Pressure on the Performance of a Heating System With a Self-Recuperative Burner. *Journal of Thermal Science and Engineering Applications*, *12*(3), 031016.

158. Lozano, C., & Rodriguez, O. (2011). Design of forest fire early detection system using wireless sensor networks. *Electronics and Electrical Engineering*, *3*(2), 402–405.

159. Macía, A. F., Estrada, D. A., Chejne, F., Velasquez, H. I., & Rengifo, R. (2005). Methodology for the conceptual design of solar kitchens. *Dyna*, *72*(146), 65–88.

160. Manrique, R., Vásquez, D., Ceballos, C., Chejne, F., & Amell, A. (2019). Evaluation of the Energy Density for Burning Disaggregated and Pelletized Coffee Husks. *ACS Omega*, *4*(2), 2957–2963.

161. Mariño, O., Muñoz, F., & Jahn, W. (2020). Soot production modelling for operational computational fluid dynamics fire simulations. *Journal of Fire Sciences*, *38*(3), 284–308.

162. Marrugo-Negrete, J., Pinedo-Hernández, J., Marrugo-Madrid, S., & Díez, S. (2021). Assessment of trace element pollution and ecological risks in a river basin impacted by mining in Colombia. *Environmental Science and Pollution Research International*, *28*(1), 201–210.

163. Mejía, C. C., García, A. M., Obando, J. E., & Amell, A. A. (2021). Numerical and experimental study of the effect of injected CO2 flow on the stability of flameless combustion. *Journal of Thermal Science and Engineering Applications*, *13*(1), 011024.

164. Mejía, J. M., Chejne, F., Molina, A., & Sadiki, A. (2016). Scalar mixing study at high-Schmidt regime in a turbulent jet flow using large-eddy simulation/filtered density function approach. *Journal of Fluids Engineering*, *138*(2), 021205.

165. Mejía, J. M., Sadiki, A., & Molina, A. (2015). Large Eddy Simulation of the mixing of a passive scalar in a high-Schmidt turbulent jet. *Journal of Fluids*. https://asmedigitalcollection.asme.org/fluidsengineering/article-abstract/137/3/031301/373748

166. Mena, J., Vera, S., Correal, J. F., & Lopez, M. (2012). Assessment of fire reaction and fire resistance of Guadua angustifolia kunth bamboo. *Construction and Building Materials*, *27*(1), 60–65.

167. Mendoza, C., Orozco, L. Y., Palacio, J., López, A. F., & Agudelo, J. R. (2021). Genotoxic and Mutagenic Activity of Particulate Matter Gathered in a High Emitter Automotive Diesel Engine Operated With Different Palm Oil-Derived Biofuels. *Journal of Energy Resources Technology*, *143*(6), 062301.

168. Mesa-Gómez, A., Casal, J., & Muñoz, F. (2020). Risk analysis in Natech events: State of the art. *Journal of Loss Prevention in the Process Industries*, *64*(104071), 104071.

169. Mesa-Gómez, A., Casal, J., Sánchez-Silva, M., & Muñoz, F. (2020). Advances and gaps in Natech quantitative risk analysis. *Processes*, *9*(1), 40.

170. Metaute Paniagua, P. M., Flórez Osorio, G. A., Rúgeles Contreras, P. A., & Castaño, D. A. (2018). The dynamization of current pedagogical strategies: a need applicable to the teaching and learning processes of engineering students of the 21st century. *Revista Lasallista de Investigación*, *15*(1), 46–56.

171. Miranda, D., Betancur, A. M., & Gutiérrez, G. (2003). Master Plans, a New Approach for Contingency Planning in the Colombian Oil Industry. *International Oil Spill Conference Proceedings*, *2003*(1), 1189–1198.

172. Molina, A., & Shaddix, C. R. (2007). Ignition and devolatilization of pulverized bituminous coal particles during oxygen/carbon dioxide coal combustion. *Proceedings of the Combustion Institute*, *31*(2), 1905–1912.

173. Molina-Escobar, J. M., & Blandón, A. (2014). Evidencias del choque térmico en partículas de polvo después de una explosión en minería de carbón. *Ingeniería Y Competitividad*, *16*(2), 23–33.

174. Molina-Terrén, D. M., Xanthopoulos, G., Diakakis, M., Ribeiro, L., Caballero, D., Delogu, G. M., Viegas, D. X., Silva, C. A., & Cardil, A. (2019). Analysis of forest fire fatalities in Southern Europe: Spain, Portugal, Greece and Sardinia (Italy). *International Journal of Wildland Fire*, *28*(2), 85–98.

175. Montoya, A., Mondragón, F., & Truong, T. N. (2002a). First-Principles Kinetics of CO Desorption from Oxygen Species on Carbonaceous Surface. *The Journal of Physical Chemistry. A*, *106*(16), 4236–4239.

176. Montoya, A., Mondragón, F., & Truong, T. N. (2002b). Formation of CO precursors during char gasification with O2, CO2 and H2O. *Fuel Processing Technology*, *77-78*, 125–130.

177. Montoya, A., Mondragón, F., & Truong, T. N. (2003). CO2 adsorption on carbonaceous surfaces: a combined experimental and theoretical study. *Carbon*, *41*(1), 29–39.

178. Montoya, A., Truong, T. N., & Sarofim, A. F. (2000). Application of Density Functional Theory to the Study of the Reaction of NO with Char-Bound Nitrogen during Combustion. *The Journal of Physical Chemistry. A*, *104*(36), 8409–8417.

179. Montoya, A., Truong, T.-T. T., Mondragón, F., & Truong, T. N. (2001). CO Desorption from Oxygen Species on Carbonaceous Surface: 1. Effects of the Local Structure of the Active Site and the Surface Coverage. *The Journal of Physical Chemistry. A*, *105*(27), 6757–6764.

180. Montoya, D., Vargas, J. E. H., Sanchez Giraldo, J., & Hincapié, N. C. (2020). Developing a Pedagogical Method to Design Interactive Learning Objects for Teaching Data Mining. *Journal of Educators Online*, *17*(1). http://files.eric.ed.gov/fulltext/EJ1241544.pdf

181. Montoya, J. I., Chejne-Janna, F., & Garcia-Pérez, M. (2015). Fast pyrolysis of biomass: A review of relevant aspects.: Part I: Parametric study. *Dyna*, *82*(192), 239–248.

182. Montoya, J. I., Valdés, C., Chejne, F., Gómez, C. A., Blanco, A., Marrugo, G., Osorio, J., Castillo, E., Aristóbulo, J., & Acero, J. (2015). Bio-oil production from Colombian bagasse by fast pyrolysis in a fluidized bed: An experimental study. *Journal of Analytical and Applied Pyrolysis*, *112*, 379–387.

183. Montoya, J., Pecha, B., Chejne Janna, F., & Garcia-Perez, M. (2016). Micro-explosion of liquid intermediates during the fast pyrolysis of sucrose and organosolv lignin. *Journal of Analytical and Applied Pyrolysis*, *122*, 106–121.

184. Montoya, J., Pecha, B., Chejne Janna, F., & Garcia-Perez, M. (2017a). Identification of the fractions responsible for morphology conservation in lignocellulosic pyrolysis: Visualization studies of sugarcane bagasse and its pseudo-components. *Journal of Analytical and Applied Pyrolysis*, *123*, 307–318.

185. Montoya, J., Pecha, B., Chejne Janna, F., & Garcia-Perez, M. (2017b). Single particle model for biomass pyrolysis with bubble formation dynamics inside the liquid intermediate and its contribution to aerosol formation by thermal ejection. *Journal of Analytical and Applied Pyrolysis*, *124*, 204–218.

186. Montoya, J., Pecha, B., Chejne Janna, F., & Garcia-Perez, M. (2017c). Methodology for estimation of thermal ejection droplet size distribution and intensity during the pyrolysis of sugarcane bagasse and model compounds. *Journal of Analytical and Applied Pyrolysis*, *125*, 69–82.

187. Montoya, J., Pecha, B., Roman, D., Chejne Janna, F., & Garcia-Perez, M. (2017). Effect of temperature and heating rate on product distribution from the pyrolysis of sugarcane bagasse in a hot plate reactor. *Journal of Analytical and Applied Pyrolysis*, *123*, 347–363.

188. Mora, N. I. M., & González, J. M. M. (2018). Estudio computacional del tiempo de autoencendido de combustible líquido en Ignition Quality Tester (IQT). *BISTUA Revista de La Facultad de Ciencias Básicas*, *17*(1), 147–158.

189. Morantes, L. R., Percebom, A. M., & Mejía-Ospino, E. (2019). On the molecular basis of aggregation and stability of Colombian asphaltenes and their subfractions. *Fuel*, *241*, 542–549.

190. Moreno Chacón, N. (2011). *Modelo de un programa de seguridad e higiene para la minería subterránea del carbón en Colombia* (J. Lescano Sandoval (ed.)) [Maestría, Universidad Nacional de Ingeniería - Perú]. https://alicia.concytec.gob.pe/vufind/Record/UUNI_bcb4c4d1954e386e72afb225af1ade8c

191. Moreno-Gamboa, F., Escudero-Atehortua, A., & Nieto-Londoño, C. (2020). Performance evaluation of external fired hybrid solar gas-turbine power plant in Colombia using energy and exergy methods. *Thermal Science and Engineering Progress*, *20*, 100679.

192. Moreno-Piraján, J. C., & Giraldo, L. (2010). Study of activated carbons by pyrolysis of cassava peel in the presence of chloride zinc. *Journal of Analytical and Applied Pyrolysis*, *87*(2), 288–290.

193. Moreno-Piraján, J. C., & Giraldo, L. (2011). Activated carbon obtained by pyrolysis of potato peel for the removal of heavy metal copper (II) from aqueous solutions. *Journal of Analytical and Applied Pyrolysis*, *90*(1), 42–47.

194. Murillo, C., Amín, M., Bardin-Monnier, N., Muñoz, F., Pinilla, A., Ratkovich, N., Torrado, D., Vizcaya, D., & Dufaud, O. (2018). Proposal of a new injection

nozzle to improve the experimental reproducibility of dust explosion tests. *Powder Technology*, *328*, 54–74.

195. Murillo Rueda, C. H. (2012). *Explosion of micro particles-CFD modeling as a tool to characterize the relevant parameters of the dust dispersion* (F. Muñoz Giraldo, O. D. López Mejía, & A. F. González Barrios (eds.)) [Ingeniería Química, Uniandes]. https://repositorio.uniandes.edu.co/bitstream/handle/1992/11802/u622741.pdf?sequence=1

196. Navarro, W., Muñoz, S. F., Ordoñez, A., & Bottia, H. (2016). Ajuste de una prueba de tubo de combustión usando un modelo simplificado de reacciones. *Fuentes, El Reventón Energético*, *14*(2), 99–109.

197. NIST, National Institute of Standards and Technology. (2021). *Fire Research Division*. https://www.nist.gov/el/fire-research-division-73300

198. Obando, J., Cadavid, Y., & Amell, A. (2015). Theoretical, experimental and numerical study of infrared radiation heat transfer in a drying furnace. *Applied Thermal Engineering*, *90*, 395–402.

199. Obando, J., Lezcano, C., & Amell, A. (2017). Experimental analysis of the addition and substitution of sub-bituminous pulverized coal in a natural gas premixed flame. *Applied Thermal Engineering*, *125*, 232–239.

200. Ocampo Pantoja, F. A. (2014). *Desarrollo de una herramienta computacional para el cálculo probabilístico de distancias umbrales de afectación a personas y estructuras producidas por escenarios de riesgo en transporte de materiales combustibles por ductos-escenarios de explosión e*

incendio de piscina (F. Muñoz Giraldo & N. Ríos Ratkovich (eds.)) [Ingeniería Química, Universidad de los Andes]. https://repositorio.uniandes.edu.co/handle/1992/16104

201. Ocampo-Zuleta, K., & Beltrán-Vargas, J. (2018). Modelación Dinámica de incendios forestales en los Cerros Orientales de Bogotá, Colombia. *Madera y Bosques*, *24*(3). https://doi.org/10.21829/myb.2018.2431662

202. Olivar, O. J. R., Mayorga, S. Z., Giraldo, F. M., Sánchez-Silva, M., Pinelli, J.-P., & Salzano, E. (2020). The effects of extreme winds on atmospheric storage tanks. *Reliability Engineering & System Safety*, *195*, 106686.

203. Oliveira, M. L. S., Pinto, D., Tutikian, B. F., da Boit, K., Saikia, B. K., & Silva, L. F. O. (2019). Pollution from uncontrolled coal fires: Continuous gaseous emissions and nanoparticles from coal mines. *Journal of Cleaner Production*, *215*, 1140–1148.

204. Oliveros, S., Acosta, J., & Forero, N. (2006). Análisis espectral de la radiación térmica del tungsteno utilizando LABVIEW. *Revista Colombiana de Física*, *38*(4), 1671–1674.

205. Ordonez-Loza, J., Valdes, C., Chejne, F., Perez, M. G., Zhang, W., Emwas, A.-H., & Sarathy, S. M. (2021). Effect of carbon dioxide environment on the thermal behavior of sugarcane pyrolysis oil. *Journal of Analytical and Applied Pyrolysis*, *154*(105000), 105000.

206. Orrego, J. A., Cabanzo Hernández, R., & Mejía-Ospino, E. (2010). Structural study of colombian coal by fourier transform infrared spectroscopy

coupled to attenuated total reflectance (FTIR-ATR). *Revista Mexicana de Física*, *56*(3), 251–254.

207. Orrego-Ruiz, J. A., Cabanzo, R., & Mejía-Ospino, E. (2011). Study of Colombian coals using photoacoustic Fourier transform infrared spectroscopy. *International Journal of Coal Geology*, *85*(3), 307–310.

208. Ortega-Ramos, C. A., Franco-Bonfante, T. M., Blandón-Montes, A., & Molina-Escobar, J. M. (2018). Evaluación del riesgo de explosividad del gas metano en minería subterránea de carbón, caso de la cuenca del Sinifaná, Colombia. *Revista Boletín de Geología*, *40*(1), 83–91.

209. Osorio, J., & Chejne, F. (2019). Bio-Oil Production in Fluidized Bed Reactor at Pilot Plant from Sugarcane Bagasse by Catalytic Fast Pyrolysis. *Waste and Biomass Valorization*, *10*(1), 187–195.

210. Padilla, J., Muñoz, S. F., Trujillo, M. L., & Rodríguez, E. (2017a). Kinetic of an In Situ Combustion Process in a Colombian Heavy Oil Using the Isoconversional Principle. *SPE Latin America and Caribbean Petroleum Engineering Conference*. https://onepetro.org/conference-paper/SPE-185456-MS

211. Padilla, J., Muñoz, S. F., Trujillo, M. L., & Rodríguez, E. (2017b). Kinetic of an In Situ Combustion process in a Colombian heavy oil using the isoconversional principle. In SPE (Ed.), *SPE Latin America and Caribbean Petroleum Engineering Conference*. SPE. https://doi.org/10.2118/185456-ms

212. Padilla, J., Rodriguez, E., Portillo, M. L., & Niño, L. C. (2016). Evaluating the Potential of an In Situ Combustion Process Using the Isoconversional

Principle. *SPE Trinidad and*. https://onepetro.org/conference-paper/SPE-180817-MS

213. Palacio, K., Sanchez, A., & Espinal, J. F. (2018). Thermodynamic evaluation of carbon dioxide gasification reactions at oxy-combustion conditions. *Combustion Science and Technology*, *190*(9), 1515–1527.

214. Pareja Bayter, V., & Ricardo Sanes, M. del C. (1994). *Diagnóstico de riesgos de la Zona Industrial de Mamonal - Cartagena* (R. Bermudez (ed.)) [Ingeniería industrial, Corporación Universitaria Tecnológica de Bolivar]. http://repositorio.utb.edu.co/handle/20.500.12585/3058

215. Parga-Lozano, C. H., Marrugo-González, A. J., & Fernández-Maestre, R. (2002). Hydrocarbon contamination in Cartagena Bay, Colombia. *Marine Pollution Bulletin*, *44*(1), 71–74.

216. Pecha, M. B., Montoya, J. I., Chejne, F., & Garcia-Perez, M. (2017). Effect of a Vacuum on the Fast Pyrolysis of Cellulose: Nature of Secondary Reactions in a Liquid Intermediate. *Industrial & Engineering Chemistry Research*, *56*(15), 4288–4301.

217. Pecha, M. B., Montoya, J. I., Ivory, C., Chejne, F., & Garcia-Perez, M. (2017). Modified Pyroprobe Captive Sample Reactor: Characterization of Reactor and Cellulose Pyrolysis at Vacuum and Atmospheric Pressures. *Industrial & Engineering Chemistry Research*, *56*(18), 5185–5200.

218. Pecha, M. B., Terrell, E., Montoya, J. I., Stankovikj, F., Broadbelt, L. J., Chejne, F., & Garcia-Perez, M. (2017). Effect of Pressure on Pyrolysis of Milled

Wood Lignin and Acid-Washed Hybrid Poplar Wood. *Industrial & Engineering Chemistry Research*, *56*(32), 9079–9089.

219. Pejic, L. M., Torrent, J. G., Añez, N. F., & Molina Escobar, J. M. (2017). Prevention and protection against propagation of Explosionsions in underground coal mines. *Journal of Mining Institute*, *225*, 307–312.

220. Pico, P., Ratkovich, N., Muñoz, F., & Dufaud, O. (2020a). CFD-DPM and experimental study of the dynamics of wheat starch powder/pyrolysis gases hybrid mixtures in the 20-L Sphere. *Powder Technology*, *372*, 638–658.

221. Pico, P., Ratkovich, N., Muñoz, F., & Dufaud, O. (2020b). Analysis of the explosion behaviour of wheat starch/pyrolysis gases hybrid mixtures through experimentation and CFD-DPM simulations. *Powder Technology*, *374*, 330–347.

222. Pinilla, A., Amin, M., Murillo, C., Torrado, D., Bardin-Monnier, N., Munoz, F., & Dufaud, O. (2019). CFD Study of the Dust Dispersion in the 20L Explosion Sphere: Influence of the Nozzle Design. *Chemical Engineering Transactions*, *77*, 121–126.

223. Pontificia Universidad Javeriana. (2021). *Maestría en seguridad y salud en el trabajo*. Pontificia Universidad Javeriana. https://www.javeriana.edu.co/maestria-seguridad-en-el-trabajo

224. Poveda-Jaramillo, J.-C., Molina-Velasco, D.-R., Bohorques-Toledo, N.-A., Torres, M.-H., & Ariza-León, E. (2016). Chemical characterization of the asphaltenes from Colombian Colorado light crude oil. *CT&F - Ciencia, Tecnología Y Futuro*, *6*(3), 105–122.

225. Pranesh, V., Palanichamy, K., Saidat, O., & Peter, N. (2017). Lack of dynamic leadership skills and human failure contribution analysis to manage risk in deep water horizon oil platform. *Safety Science*, *92*, 85–93.

226. Quiceno, R., Chejne, F., & Hill, A. (2002). Proposal of a Methodology for Determining the Main Chemical Reactions Involved in Methane Combustion. *Energy & Fuels: An American Chemical Society Journal*, *16*(3), 536–542.

227. Quintero, J. A., Candela, S. A., Ríos, C. A., Montes, C., & Uribe, C. (2009). Spontaneous combustion of the Upper Paleocene Cerrejón Formation coal and generation of clinker in La Guajira Peninsula (Caribbean Region of Colombia). *International Journal of Coal Geology*, *80*(3), 196–210.

228. Ramírez, J., Soto, D., López, S., Akroyd, J., Nurkowski, D., Botero, M. L., Bianco, N., Brownbridge, G., Kraft, M., & Molina, A. (2020). A virtual laboratory to support chemical reaction engineering courses using real-life problems and industrial software. *Education for Chemical Engineers*, *33*, 36–44.

229. Rangel-Buitrago, N. G., Anfuso, G., Williams, A., Bonetti, J., Adriana, G. C., & Ortiz, J. C. (2018). Risk assessment to extreme wave events: The Barranquilla – cienaga, Caribbean of Colombia case study. In *Beach Management Tools - Concepts, Methodologies and Case Studies* (pp. 469–496). Springer International Publishing.

230. Reyes, F., Pérez Alcázar, G. A., Barraza, J. M., Bohórquez, A., Tabares, J. A., & Speziali, N. L. (2003). Mössbauer and XRD Characterization of the Mineral Matter of Coal from the Guachinte Mine in Colombia. *Hyperfine Interactions*, *148*(1), 39–46.

231. Riveros Álvarez, N. (2014). *Aportes en investigación de los programas de posgrado en materia de salud ocupacional en el país* (L. H. Barrero Solano (ed.)) [Ingeniería Industrial, Pontificia Universidad Javeriana]. https://repository.javeriana.edu.co/handle/10554/16531

232. Rodriguez, E., & Palma-Bustamante, J. M. (2013). The Role Of The Phase Behavior Model within The Numerical Simulation Of In Situ Combustion Processes. *SPE Heavy Oil Conference-Canada*. https://onepetro.org/conference-paper/SPE-165429-MS

233. Rodríguez-Sandoval, E., & Cortés-Rodriguez, M. (2010). Evaluación de la estrategia pedagógica “aprendizaje basado en proyectos”: percepción de los estudiantes. *Avaliação: Revista da Avaliação da Educação Superior (Campinas)*, *15*, 143–158.

234. Rojas, A., Barraza, J., Barranco, R., & Lester, E. (2012). A new char combustion kinetic model – Part 2: Empirical validation. *Fuel*, *96*, 168–175.

235. Rojas S, M., Chejne, F., Ciro, H., & Montoya, J. (2020). Roasting impact on the chemical and physical structure of Criollo cocoa variety (Theobroma cacao L). *Journal of Food Process Engineering*, *43*(6). https://doi.org/10.1111/jfpe.13400

236. Romero Millán, L. M., Sierra Vargas, F. E., & Nzihou, A. (2017). Kinetic Analysis of Tropical Lignocellulosic Agrowaste Pyrolysis. *Bioenergy Research*, *10*(3), 832–845.

237. Rosenberg, T. (1999). Statistics for fire prevention in Sweden. *Fire Safety Journal*, *33*(4), 283–294.

238. Rozo-Rojas, I., Cartagena Linares, C. J., Jaimes Parada, H. D., Cuarán Valenzuela, J. R., & López Sánchez, N. M. (2018). Implementation of the Pedagogical Strategy Integrated Project in Four Engineering Bachelor Programs at Bogota. *2018 Congreso Internacional de Innovación Y Tendencias En Ingeniería (CONIITI)*, 1–5.

239. Rubio Gaviria, L., Echeverri Uribe, C., Yepes Tumay, H., & Amell Arrieta, A. (2014). Theoretical and experimental study of the laminar deflagration velocity of a glp/synthesis gas mixture. *Ingenius-Revista de Ciencia Y Tecnología*, *12*, 62–67.

240. Rueda, A. (1973). Fluctuations of the Intensity in Thermal Radiation and the Thermodynamic Fluctuations of Emitters. *Physical Review. A*, *8*(4), 2099–2102.

241. Ruiz-Guzmán, J. A., Marrugo-Negrete, J. L., & Díez, S. (2014). Human Exposure to Mercury Through Fish Consumption: Risk Assessment of Riverside Inhabitants of the Urrá Reservoir, Colombia. *Human and Ecological Risk Assessment: An International Journal*, *20*(5), 1151–1163.

242. Saavedra, J., Merino, L., Gómez, M., & Kafarov, V. (2014). Optimización de la combustión utilizando como criterios de evaluación el índice de Wobbe y el número de metano. *Iteckne*, *11*(1), 1692–1798.

243. Sáenz, O. (2021). Sustainability Competences and Pedagogical Approaches at the Universidad de Ciencias Aplicadas y Ambientales. *Sustainability Competences Through Pedagogical …*. https://books.google.com/books?hl=es&lr=&id=X4okEAAAQBAJ&oi=fnd&pg=PA

127&dq=pedagogical+colombia+engineering&ots=nHB8yfcztW&sig=Dsg9hI67zCPDeSiITfRHFh6moIg

244. Salamanca, J. (2012). *Implementación de defensas contra incendios para un parque de almacenamiento de hidrocarburos mediante análisis de consecuencias con PHAST 6.6* (F. Muñoz (ed.)) [B.Sc. Chemical Engineering, Uniandes]. https://repositorio.uniandes.edu.co/bitstream/handle/1992/25105/u627401.pdf?sequence=1

245. Salamanca, M., Agudelo, J. R., Mondragón, F., & Santamaría, A. (2012). Chemical Characteristics of the Soot Produced in a High-Speed Direct Injection Engine Operated with Diesel/Biodiesel Blends. *Combustion Science and Technology*, *184*(7-8), 1179–1190.

246. Salamanca, M., Mondragón, F., Agudelo, J. R., Benjumea, P., & Santamaría, A. (2012). Variations in the chemical composition and morphology of soot induced by the unsaturation degree of biodiesel and a biodiesel blend. *Combustion and Flame*, *159*(3), 1100–1108.

247. Salamanca, M., Mondragón, F., Agudelo, J. R., & Santamaría, A. (2012). Influence of palm oil biodiesel on the chemical and morphological characteristics of particulate matter emitted by a diesel engine. *Atmospheric Environment*, *62*, 220–227.

248. Salamanca, M., Velásquez, M., Mondragón, F., & Santamaría, A. (2012). Variations of the Soot Precursors Chemical Composition Induced by Ethanol

Addition to Fuel. *Energy & Fuels: An American Chemical Society Journal*, *26*(11), 6602–6611.

249. Salamanca-Zapata, J. S. (2012). *Implementación de defensas contra incendios para un parque de almacenamiento de hidrocarburos mediante análisis de consecuencias con PHAST 6.6* (F. Muñoz Giraldo & J. M. Gómez Ramírez (eds.)) [Ingeniero químico, Uniandes]. https://repositorio.uniandes.edu.co/handle/1992/25105

250. Salazar Orozco, C. J. (2013). *Aplicación de la teoría Bayesiana al análisis de riesgo en el proceso de producción de biodiesel, para la estimación de las probabilidades de ocurrencia de eventos accidentales* (F. Muñoz Giraldo (ed.)) [Chemical Engineering, Uniandes]. https://repositorio.uniandes.edu.co/handle/1992/19936

251. Saldarriaga, J. F., Patino, J. A., & Lizarazo, M. J. (2018). Kinetic Study of Spiny Retamo (Ulex Eurioaeus L.) Waste Oxidative Pyrolysis. *Chemical Engineering Transactions*, *70*, 1249–1254.

252. Salgado-Gálvez, M. A., Zuloaga-Romero, D., Bernal, G. A., Mora, M. G., & Cardona, O.-D. (2014). Fully probabilistic seismic risk assessment considering local site effects for the portfolio of buildings in Medellín, Colombia. *Bulletin of Earthquake Engineering*, *12*(2), 671–695.

253. Sanchez, A., Ramirez, S., Silva, W., & Espinal, J. F. (2019). Prediction of 1,3,5-triisopropylbenzene cracking pattern through thermodynamic evaluation of products and protonation intermediates. *Molecular Catalysis*, *466*, 13–18.

254. Sánchez, M., Cadavid, F., & Amell, A. (2013). Experimental evaluation of a 20kW oxygen enhanced self-regenerative burner operated in flameless combustion mode. *Applied Energy*, *111*, 240–246.

255. Sanmiquel, L., Rossell, J. M., & Vintró, C. (2015). Study of Spanish mining accidents using data mining techniques. *Safety Science*, *75*, 49–55.

256. Santamaria, A., Yang, N., Eddings, E., & Mondragon, F. (2010). Chemical and morphological characterization of soot and soot precursors generated in an inverse diffusion flame with aromatic and aliphatic fuels. *Combustion and Flame*, *157*(1), 33–42.

257. Saxena, S., Dario Bedoya, I., Shah, N., & Phadke, A. (2013). Understanding Loss Mechanisms and Identifying Areas of Improvement for HCCI Engines Using Detailed Exergy Analysis. *Journal of Engineering for Gas Turbines and Power*, *135*(9). https://doi.org/10.1115/1.4024589

258. Sedano, C. A., López, O. D., Ladino, A., & Muñoz, F. (2017). Prediction of a Small-Scale Pool Fire with FireFoam. *International Journal of Chemical Engineering*, *2017*. https://doi.org/10.1155/2017/4934956

259. Serrano, J., Pico, P., Amín, M., Pinilla, A., & Torrado, D. (2020). Experimental and CFD-DEM study of the dispersion and combustion of wheat starch and carbon-black particles during the standard 20L sphere test. *Journal of Loss*. https://www.sciencedirect.com/science/article/pii/S0950423019305662

260. Shaddix, C. R., & Molina, A. (2009). Particle imaging of ignition and devolatilization of pulverized coal during oxy-fuel combustion. *Proceedings of the Combustion Institute*, *32*(2), 2091–2098.

261. Shin, I. J. (2013). Major industrial accidents in Korea: The characteristics and implication of statistics 1996-2011. *Process Safety Progress*, *32*(1), 90–95.

262. Soriano, J. A., García-Contreras, R., de la Fuente, J., Armas, O., Orozco-Jiménez, L. Y., & Agudelo, J. R. (2020). Genotoxicity and mutagenicity of particulate matter emitted from diesel, gas to liquid, biodiesel, and farnesane fuels: A toxicological risk assessment. *Fuel*, *282*, 118763.

263. Soto Ortiz, J. D., Oliveros, I., Díaz, L. L., & Rueda, A. (2020). Pedagogical innovation to develp engineering skills in apower systemscourse through laboratory practices in a microgrid-unigrid. *14th International Technology, Education and Development Conference*, 3159–3163.

264. Spearpoint, M., & Hopkin, C. (2020). A Study of the Time of Day and Room of Fire Origin for Dwelling Fires. In *Fire Technology* (Vol. 56, Issue 4, pp. 1465–1485). https://doi.org/10.1007/s10694-019-00934-5

265. Statistics Bureau, Ministry of Internal Affairs, Japan. (2021). *Japan Statistical Yearbook - Chapter 29 Disasters and Accidents*. Statistics Bureau ofJapan. http://www.stat.go.jp/english/data/nenkan/1431-29e.html

266. Suárez, J. L., Amell-Arrieta, A. A., & Cadavid, F. J. (2011). Estudio numérico y experimental de las propiedades y fenómenos radiativos en una llama de metano (ch4) con aire enriquecido. *Dyna*, *78*(165), 138–149.

267. Suarez-Paba, M. C., Cruz, A. M., & Muñoz, F. (2020). Emerging Natech risk management in Colombia: A survey of governmental organizations. *Safety Science*, *128*, 104777.

268. Suarez-Paba, M. C., Perreur, M., Munoz, F., & Cruz, A. M. (2019). Systematic literature review and qualitative meta-analysis of Natech research in the past four decades. *Safety Science*, *116*, 58–77.

269. Technische Universität Braunschweig. (2021). *Institut für Baustoffe, Massivbau und Brandschutz*. Institut Für Baustoffe, Massivbau Und Brandschutz. http://www.ibmb.tu-braunschweig.de/index.php/institut.html

270. The Faculty of Architecture, Computing & Humanities-University of Greenwich. (2021). *Fire Safety Engineering Group (FSEG) Home*. Fire Safety Engineering Group. https://fseg.gre.ac.uk/

271. The University of Edinburgh. (2021). *Edinburgh Fire Research Centre*. The University of Edinburgh. https://www.fire.eng.ed.ac.uk/

272. The University of Queensland. (2021). *Fire safety engineering - School of Civil Engineering - University of Queensland*. The University of Queensland - School of Civil Engineering. https://civil.uq.edu.au/research/fire-safety-engineering

273. Torrado, D. (2017). Effect of carbon black nanoparticles on the explosion severity of gas mixtures. *Universite de Lorraine, Nancy, France (PhD Thesis)*. http://docnum.univ-lorraine.fr/public/DDOC_T_2017_0199_TORRADO.pdf

274. Torrado, D., Pinilla, A., Amin, M., Murillo, C., Munoz, F., Glaude, P.-A., & Dufaud, O. (2018). Numerical study of the influence of particle reaction and radiative heat transfer on the flame velocity of gas/nanoparticles hybrid mixtures. *Process Safety and Environmental Protection*, *118*, 211–226.

275. Tovar, C., Aranguren, D., López, J., Inampués, J., & Torres, H. (2014). Lightning risk assessment and thunderstorm warning systems. *2014 International Conference on Lightning Protection (ICLP)*, 1870–1874.

276. Trefftz, H., Restrepo, J., Esteban, P., Jimenez, A. M., & Giraldo, F. D. (2010). Virtual Collaborative Learning Environments with the Telepresence Platform Supported by the Teaching for Understanding Pedagogical Framework: Experiences in Higher Educational Process in Colombia. *E-Learning*. https://doi.org/10.5772/7775

277. Ulster University. (2021). *Fire Safety Engineering Research and Technology Centre (FireSERT)*. Ulster University. https://www.ulster.ac.uk/research/topic/built-environment/fire-safety-engineering

278. Universidad Autónoma de Occidente - Facultad de Ingeniería. (2020, April 8). *Maestría en Seguridad y Salud en el Trabajo - U. Autónoma de Occidente*. Universidad Autónoma de Occidente. https://www.uao.edu.co/programa/maestria-en-seguridad-y-salud-en-el-trabajo/

279. Universidad Católica de Manizales. (2021). *Especialización en Seguridad y Salud en el Trabajo*. Universidad Católica de Manizales. http://www.ucm.edu.co/programa/especializacion-en-seguridad-y-salud-en-el-trabajo/

280. Universidad CES. (2021). *Especialización en Seguridad y Salud en el Trabajo - Universidad CES*. Universidad CES. https://www.ces.edu.co/programas/especializaciones/especializacion-en-seguridad-y-salud-en-el-trabajo-medellin/

281. Universidad de Boyacá. (2021). *Especialización en Seguridad y Salud en el Trabajo (Virtual)*. Universidad de Boyacá. https://www.uniboyaca.edu.co/es/ciencias-de-la-salud/especializacion-en-seguridad-y-salud-en-el-trabajo-virtual

282. Universidad del Norte. (2021). *Especialización en Seguridad y Salud en el Trabajo*. Universidad Del Norte. https://www.uninorte.edu.co/web/especializacion-en-seguridad-y-salud-en-el-trabajo

283. Universidad del Valle - Facultad de Salud. (2021). *Maestría en Salud Ocupacional*. Universidad Del Valle. https://salud.univalle.edu.co/posgrados/maestrias/maestria-en-salud-ocupacional

284. Universidad Manuela Beltrán. (2021). *Especialización de Salud Ocupacional y Riesgos Laborales*. Universaidad Manuela Beltrán. https://umb.edu.co/programa/especializacion-en-salud-ocupacional-y-riesgos-laborales/

285. Universidad Nacional de Colombia - Facultad de enfermería. (2021). *Especialización en salud y seguridad en el trabajo*. Universidad Nacional de Colombia. http://enfermeria.bogota.unal.edu.co/menu-principal/programas/especializaciones/especializacion-en-salud-y-seguridad-en-el-trabajo/informacion-sobre-el-programa/

286. Universidad Nacional de Colombia - Facultad de Enfermería. (2021). *Maestría en salud y seguridad en el trabajo*. Universidad Nacional de Colombia. http://enfermeria.bogota.unal.edu.co/menu-

principal/programas/maestrias/maestria-en-salud-y-seguridad-en-el-trabajo/informacion-sobre-el-programa/

287. Universidad pedagógica y tecnológica de Colombia. (2021). *Especialización en Seguridad y Salud en el Trabajo*. Universidad Pedagógica Y Tecnológica de Colombia. http://www.uptc.edu.co/facultades/f_salud/posgrado/seguridad_salud/inf_general/index.html

288. University of Central Lancashire. (2021). *Fire Safety Engineering*. University of Central Lancashire. https://www.uclan.ac.uk/postgraduate/courses/fire-safety-engineering-msc

289. University of Maryland - Department of Fire Protection Engineering. (2021). *Master of Engineering*. University of Maryland. https://fpe.umd.edu/graduate/degrees/master-engineering

290. University of New Haven - Henry C. Lee College of Criminal Justice and Forensic Sciences. (2021). *Fire and Explosion Investigation, M.S. - University of New Haven*. University of New Haven. https://www.newhaven.edu/lee-college/graduate-programs/fire-science/

291. University of Science and Technology of China. (2021). *State Key Laboratory of Fire Science*. State Key Laboratory of Fire Science. http://en.sklfs.ustc.edu.cn/

292. Uribe-Salazar, E. Y., Herrera-Múnera, B. A., & Bedoya-Caro, I. D. (2019). Theoretical, numerical and experimental study of interchangeability of natural gas in Antioquia. *Dyna*, *86*(208), 346–354.

293. U.S. Fire Administration. (2021, April 30). *U.S. fire statistics*. U.S. Fire Administration. https://www.usfa.fema.gov/data/statistics/

294. Valdés, C. F., & Chejne, F. (2017). Effect of reaction atmosphere on the products of slow pyrolysis of coals. *Journal of Analytical and Applied Pyrolysis*, *126*, 105–117.

295. Valdés, C. F., & Chejne, F. (2018a). Fast pyrolysis of coal particles in a novel hot plate reactor: Implications of the reaction atmosphere on the reactivity and char chemical structure. *Journal of Analytical and Applied Pyrolysis*, *130*, 43–51.

296. Valdés, C. F., & Chejne, F. (2018b). Fast pyrolysis of large coal particles in a novel hot plate reactor: Effects of the reaction atmosphere on the porous structure and char reactivity. *Journal of Analytical and Applied Pyrolysis*, *133*, 39–47.

297. Valdés, C. F., Marrugo, G., Chejne, F., Román, J. D., & Montoya, J. I. (2016). Effect of atmosphere reaction and heating rate on the devolatilization of a Colombian sub-bituminous coal. *Journal of Analytical and Applied Pyrolysis*, *121*, 93–101.

298. Valdés Renteria, C. F., Guerrero, Y. B., López López, D. P., Gutiérrez Gómez, C. A., & Chejne Janna, F. (2018). Effects of pyrolysis atmosphere on the porous structure and reactivity of chars from middle and high rank coals. *Ingeniería E Investigación*, *38*(1), 31–45.

299. Valencia-López, A. M., Bustamante, F., Loukou, A., Stelzner, B., Trimis, D., Frenklach, M., & Slavinskaya, N. A. (2019). Effect of benzene doping on soot

precursors formation in non-premixed flames of producer gas (PG). *Combustion and Flame*, *207*, 265–280.

300. Vargas, A. C., García, A. M., Arrieta, C. E., Sierra Del Rio, J., & Amell-Arrieta, A. A. (2020). Burning Velocity of Turbulent Methane/Air Premixed Flames in Subatmospheric Environments. *ACS Omega*, *5*(39), 25095–25103.

301. Vásquez, D., Maya, J. C., Manrique, R., Ceballos, C., & Chejne, F. (2020). Development of a low-temperature water heating system based on the combustion of CH4 in porous-media. *Energy*, *209*, 118461.

302. Vásquez Sierra, E. B., & Herrera Builes, J. F. (2006). Metodología para la caracterización de combustibles sólidos maderables del área metropolitana del Valle de Aburrá “AMVA”, Colombia. *Revista Facultad Nacional de Agronomía - Medellín*, *59*(2), 3557–3564.

303. Velásquez, M., Mondragón, F., & Santamaría, A. (2013). Chemical characterization of soot precursors and soot particles produced in hexane and diesel surrogates using an inverse diffusion flame burner. *Fuel*, *104*, 681–690.

304. Vélez, E., Quijano, J., Notario, R., Pabón, E., Murillo, J., Leal, J., Zapata, E., & Alarcón, G. (2009). A computational study of stereospecifity in the thermal elimination reaction of menthyl benzoate in the gas phase. *Journal of Physical Organic Chemistry*, *22*(10), 971–977.

305. Villabona-Estupiñan, S., Rojas-Ruiz, F. A., Pinto-Camargo, J. L., Manrique, E. J., & Orrego-Ruiz, J. A. (2020). Characterization of petroleum compounds adsorbed on solids by infrared spectroscopy and mass spectrometry. *Energy & Fuels: An American Chemical Society Journal*, *34*(5), 5317–5330.

306. Vizcaya, D., Pinilla, A., Amín, M., Ratkovich, N., Muñoz, F., Murillo, C., Bardin-Monnier, N., & Dufaud, O. (2018). CFD as an approach to understand flammable dust 20 L standard test: Effect of the ignition time on the fluid flow. *AIChE Journal*, *64*(1), 42–54.

307. Worcester Polytechnic Institute. (2021). *Fire Protection Engineering*. Worcester Polytechnic Institute. https://www.wpi.edu/academics/departments/fire-protection-engineering

308. Yanes, A., Botero, C. M., Arrizabalaga, M., & Vásquez, J. G. (2019). Methodological proposal for ecological risk assessment of the coastal zone of Antioquia, Colombia. *Ecological Engineering*, *130*, 242–251.

309. Yepes, H. A., & Amell, A. A. (2013). Laminar burning velocity with oxygen-enriched air of syngas produced from biomass gasification. *International Journal of Hydrogen Energy*, *38*(18), 7519–7527.

310. Yepes, H. A., Arrieta, C. E., & Amell-Arrieta, A. A. (2019). Flameless combustion as an alternative for improving the efficiency of thermal systems: state-of-the-art review. *TecnoLógicas*, *22*(46), 204–243.

311. Yepes-Tumay, H. A., & Cardona-Vargas, A. (2019). Influence of high ethane content on natural gas ignition. *Revista Ingenio*, *16*(1), 36–42.

312. Ye, P., Sun, C., Lapuerta, M., Agudelo, J., Vander Wal, R., Boehman, A. L., Toops, T. J., & Daw, S. (2016). Impact of rail pressure and biodiesel fueling on the particulate morphology and soot nanostructures from a common-rail turbocharged direct injection diesel engine. *International Journal of Engine Research*, *17*(2), 193–208.

313. Zabala-Vargas, S., García-Mora, Lewis, Arciniegas-Hernández, E., & Reina-Medrano, J. (2021). Strengthening Motivation in the Mathematical Engineering Teaching Processes-A Proposal from Gamification and Game-Based Learning. *International Journal of Emerging Technologies in Learning*, *16*(6), 4–19.

314. Zapateiro Puente, C. O. (2017). *Desarrollo de un análisis de sensibilidad sobre las entradas de la etapa de análisis de consecuencias en un QRA para una tubería de transporte urbano de combustible, para identificar fuentes significativas de incertidumbre en los índices de riesgo individidual y social* (F. Muñoz Giraldo & N. Ríos Ratkovich (eds.)) [Ingeniería química]. Universidad de los Andes.

315. Zhang, H.-D., & Zheng, X.-P. (2012). Characteristics of hazardous chemical accidents in China: A statistical investigation. *Journal of Loss Prevention in the Process Industries*, *25*(4), 686–693.

316. Zhang, J., Fu, J., Hao, H., Fu, G., Nie, F., & Zhang, W. (2020). Root causes of coal mine accidents: Characteristics of safety culture deficiencies based on accident statistics. *Process Safety and Environmental Protection*, *136*, 78–91.

317. Zhang, J., Xu, K., Reniers, G., & You, G. (2020). Statistical analysis the characteristics of extraordinarily severe coal mine accidents (ESCMAs) in China from 1950 to 2018. *Process Safety and Environmental Protection*, *133*, 332–340.

318. Zhu, Y., Wang, D., Shao, Z., Xu, C., Zhu, X., Qi, X., & Liu, F. (2019). A statistical analysis of coalmine fires and explosions in China. *Process Safety and Environmental Protection*, *121*, 357–366.

319. Zuleta, E. C., Rios, L. A., & Benjumea, P. N. (2012). Oxidative stability and cold flow behavior of palm, sacha-inchi, jatropha and castor oil biodiesel blends. *Fuel Processing Technology*, *102*, 96–101.

320. Zuorro, A., Moreno-Sader, K. A., & González-Delgado, Á. D. (2020). *Inherent safety Analysis and Sustainability Evaluation of Chitosan Production from Shrimp Exoskeleton in Colombia*. https://doi.org/10.20944/preprints202011.0612.v1