

Cleveland State University

EngagedScholarship@CSU

Undergraduate Research Posters 2018

Undergraduate Research Posters


2018

Multi-phase Waste Gasification – Reaction Engineering for Sustainable Living Environments

Kristen M. Reyes
Cleveland State University

Mason J. Lang

Follow this and additional works at: https://engagedscholarship.csuohio.edu/u_poster_2018

 Part of the [Biomedical Engineering and Bioengineering Commons](#), and the [Chemical Engineering Commons](#)

[How does access to this work benefit you? Let us know!](#)

Recommended Citation

Reyes, Kristen M. and Lang, Mason J., "Multi-phase Waste Gasification – Reaction Engineering for Sustainable Living Environments" (2018). *Undergraduate Research Posters 2018*. 62.

https://engagedscholarship.csuohio.edu/u_poster_2018/62

This Book is brought to you for free and open access by the Undergraduate Research Posters at EngagedScholarship@CSU. It has been accepted for inclusion in Undergraduate Research Posters 2018 by an authorized administrator of EngagedScholarship@CSU. For more information, please contact library.es@csuohio.edu.



Multi-phase Waste Gasification: Reaction Engineering for Sustainable Living Environments

Washkewicz College of Engineering

Student Researchers: Kristen M. Reyes and Mason J. Lang

Faculty Advisor: Jorge E. Gatica

Abstract

Gasification converts carbon-based (organic) materials into gaseous products typically referred to as synthetic gas. This technology is an alternative for reducing carbon footprint of energy generation as well as for waste management. This research examines Catalytic Gasification as a route to Sustainability while converting spaceflight and municipal waste into high-value products. As polyethylene (PE) makes up one of the largest portions of both municipal and space waste, this project centered its attention on the gasification of mid-density PE. We used a slurry containing mid-density PE, water, and solid catalysts (ruthenium on alumina, Ru/Al₂O₃) in a 1:1 PE/Ru ratio. The gasification process was investigated in a high-pressure/high-temperature batch reactor operating under isothermal conditions for reaction temperatures between 310-320 °C, and various reaction times. Solid and gas residuals were collected and analyzed in the GC and DSC, respectively. Preliminary kinetic characterization and process assessment are presented.