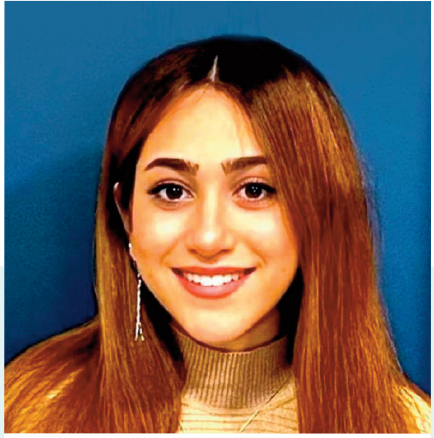
POSTER EXPOSITION

Poster 10

Capture and Reduction of Carbon Emissions to Maximize Circularity in the Steelmaking Process



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ABSTRACT:
Our research work investigates an innovative approach for methane synthesis from steelmaking off-gases (CO and CO_2) using hydrogen derived from the pyrolysis of waste plastic (polypropylene (PP)). Employing the Gibbs free energy minimization method, we conducted a simulation-based analysis to optimize thermodynamic parameters and evaluate the energy and exergy efficiencies of the integrated process. The study identifies optimal conditions for hydrogen production and methanation while addressing critical challenges, such as coke formation and catalyst deactivation. By ensuring efficient carbon utilization and high conversion rates, this approach offers a sustainable pathway for methane production. Our findings underscore the potential of integrating steelmaking off-gas conversion with polymer pyrolysis to reduce greenhouse gas emissions and enhance energy efficiency, paving the way for more sustainable industrial applications.

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