National Institute of Technology Rourkela

Departmental Seminar

Seminar Title	: Conference Return Seminar on Sustainable production of commodity chemicals using biomass via Chemical Looping Combustion (CLC)
Speaker	: Prof. Mahendra Chinthala (Ec-1201365)
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Venue	: Old Seminar Hall, Chemical Engg. Department
Date and Time	: 06 Dec 2024 (11.00 A.M.)
Abstract	: Traditional chemical production often contributes to significant pollution, greenhouse gas emissions, and resource depletion. In contrast, sustainable practices seek to reduce these impacts by promoting cleaner production methods. One promising approach is transitioning to renewable feedstocks, such as biomass or waste materials, which can ensure a more dependable supply of raw materials. This simulation study explores a sustainable method for ammonia (NH_3) production by integrating biomass-derived syngas with Chemical Looping Combustion (CLC). In this process, biomass serves as the primary feedstock, producing synthesis gas (syngas) through gasification. The study examines the use of this syngas within a CLC system, utilizing a Fe2O3/Fe3O4 carrier to efficiently convert nitrogen into ammonia. The integration of CLC not only enhances the conversion efficiency but also offers inherent carbon capture capabilities, leading to cleaner combustion and a reduced carbon footprint. Additionally, the study provides valuable insights into optimizing key parameters for improved syngas and hydrogen production, establishing a solid foundation for sustainable and efficient ammonia synthesis. Keywords: Ammonia; Biomass; chemical looping combustion; gasification; hydrogen