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Co-gasification of biomass and coal in fluidized bed gasifier

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Coal is the main commercial energy fuel in India, amounting to 61% of installed electrical capacity as of 31st March, 2016. However, apart from the issue of being a fossil fuel with limited resource, Indian coal is of low quality, high ash content and low calorific value and so, it cannot be utilized efficiently. Another major concern associated with the usage of coal is the emissions. Recent research has proven that adoption of co-gasification technology (using mixed feed of biomass and coal) for power generation will help overcome these challenges. Co-gasification in fluidized bed gasifier provides excellent mixing and gas solid interaction that enhance the chemical reaction rate and conversion efficiency. The most attractive benefit of co-gasification is the reduction of greenhouse gas emissions, environmental pollution and effective utilization of low grade coal. At IIT Guwahati three types of locally and abundantly available agricultural waste biomasses viz; saw dust, rice husk and bamboo dust, have been selected for co-gasification in circulating fluidized bed gasifier. It has been observed that the biomass characterization and percentage of biomass blends with coal is very important as it is directly related to the fuel gas composition. Co-gasification process not only produces a low carbon footprint on the environment, but also improves the H_2/CO ratio in the produced syngas, which is required for liquid fuel synthesis. The inorganic matter present in biomass catalyzes the gasification of coal. Additionally, recent research investigations reported superior gas quality by using coal-biomass blends at different operating condition of temperatures.

Biography

Pinakeswar Mahanta is a Professor in the Department of Mechanical Engineering, IIT Guwahati. His major area of research is on thermodynamics, heat transfer and renewable energy. He has established an international platform for research in the area of bio-energy with University of Nottingham, University of Birmingham, and Loughborough University, UK. Similarly, he has established collaboration in the field of clean coal technology with University of Cranfield, UK and UCL, Belguim. He has published more than 60 papers in internationally reputed peer reviewed journals and supervised 9 PhDs. Currently, he holds the position of the Dean of Faculty Affairs at IIT Guwahati.

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