Contribution ID: **16** Type: **Oral Presenter**

Fluidized Bed Heat Exchange Capacity of Alumina, Coal-char and Bio-char Solids

Fluidized bed heat exchanger (FBHx) units have significant applications in various industrial processes. Heat transfer coefficient, pressure drop and superficial gas velocity are the most salient parameters used to characterize the behavior of solids in the FBHx. This research broadly identifies the pressure drop and surface heat transfer coefficient of Alumina, Coal-Char and bio-char solids in FBHx. The pressure drop and heat transfer coefficient were calculated at fixed bed height of 6cm by maintaining air flow rate of 8-100 Liters per minute (LPM). Digital temperature sensors are used to measure the bed temperature, air inlet temperature, and heater surface temperature. The results of this study suggest that the effects on surface heat transfer coefficient and pressure drop in FBHx are influenced by bed materials. Among the tested materials, pressure drop and heat transfer coefficient were found of order Alumina>coal-char>bio-char.

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Session Classification: Chemical Engineering

Track Classification: Chemical & Material Engineering