

Variation of Solid Circulation Rate in Viscous Liquid-Solid Circulating Fluidized Beds

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Liquid-solid circulating fluidized-bed (LSCFB) can be utilized as a reactor or a contactor in the fields of petrochemical, biochemical, food, metallurgical and medical engineering due to its highly effective and unique features. Especially, it can be adopted in the process of continuous regeneration of deactivated catalyst, adsorbent or absorption media. In addition, it can be employed in several continuous processes to increase the fractional conversion and production rate. However, there has been little information on the solid circulation rate, which is one of important factors inevitable in operating and designing the LSCFB. Therefore, in the present study, variations of solid circulation rate were investigated in the LSCFB with viscous liquid medium. Effects of primary and secondary liquid velocities, particle size, height of solid particles piled up in the solid recycle device, and liquid viscosity up to 50 mPa·s on the solid circulation rate were examined. The value of solid circulation rate increased with increasing the liquid velocities of primary and secondary, piled height of solid particles in the recycle device, and liquid viscosity, however it decreased with increasing particle size (0.5 ~ 3.0 mm). The solid circulation rate was well correlated with operating variables within this experimental conditions.