# Radial gas mixing characteristics in a circulating fluidized bed

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Gas and solid mixing is very important information to predict reaction conversion in fluidized bed reactors. When chemical reactions occur in a circulating fluidized bed, gas concentration profiles of the core region are different from those of the annulus region in the bed. The degree of conversion of reactions depends on gas exchange rate between these two regions. In the present study, the radial gas mixing characteristics in the fast fluidizing regime of a circulating fluidized bed (5 cm-i.d. × 6 m-high) have been determined. As a bed material, the catalyst A having a mean diameter of 71 ㎛ and a particle density of 1969 kg/m$^3$ for cracking of heavy naphtha was used. Helium gas was used as a tracer gas to avoid gas adsorption on catalyst. The effects of gas velocity (1.5 - 3.4 m/s) and the solid circulation rate (0 - 170 kg/m$^2$s) on the radial gas dispersion or mixing coefficient in the dilution region were determined. The radial gas dispersion coefficients ($D_r$) decrease with increasing gas velocity in the riser. Whereas, in the dense region, the radial gas dispersion coefficients sharply decrease with increasing gas velocity due to the vigorous bubbling motion in this region.