

83g Axial Dispersion of Gas Phase in Slurry Bubble Column Reactor

Lu Han and Muthanna H. Al-Dahhan

A gaseous tracer technique and procedures were developed and implemented to measure the axial dispersion of gas phase in a slurry bubble column reactor using air-water-glass beads (100 μ m). Residence time distribution curves were obtained by measuring the response of gaseous tracer pulse input. The gas phase axial dispersion coefficient, D_g , was determined from minimum square error fit of the axial dispersion model to the measured tracer response data. The effects of solids loading on the gas axial dispersion and the overall gas holdup have been investigated. It was demonstrated that increasing solids loading enhances the gas axial dispersion while decreasing the overall gas holdup. This work suggests that gas phase axial dispersion is not negligible in reactor performance evaluation of bubble columns or slurry bubble columns.

Keywords: Axial dispersion, Slurry bubble column, Solids loading, Gas holdup, Gaseous tracer, Residence time distribution