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Linking Radial Species Segregation and Bubbling Patterns in Gas-Fluidized Beds.[1] GUSTAVO JOSEPH, CHRISTINE HRENYA, JOE KOZLOWSKI, University of Colorado — Binary mixtures of gas-fluidized Geldart Group B particles with size and/or density differences were experimentally investigated at gas velocities up to 3 times the complete fluidization velocities (u_{fc}) of the mixtures. Steady state operation of the bed was ensured prior to data collection. Local bubbling information (mean bubble size, bubble rise velocity, and bubbling frequency) was obtained throughout the bed by means of a backscattered-light optical probe. Segregation data were obtained via bed "freezing" and subsequent sieving of layers. Monodisperse runs were also performed as benchmarks for the binary-mixture runs. Perceptible radial variations in species composition were encountered, with the less massive particles tending toward the bed center in most cases. For systems where the species differed in both size and density, the bottom layer presents a reversal of radial segregation pattern at gas velocities below $2u_{fc}$. At velocities below $2u_{fc}$, bubbling is seen predominantly at the bed periphery, with qualitative differences between monodisperse and mixed systems above $2u_{fc}$. A detailed analysis of the bubbling patterns at the various compositions and gas velocities is presented, and links to the observed segregation behavior are made.

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