

Gas-liquid flows through porous media in microgravity: Packed Bed Reactor Experiment-2

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Abstract

Experimental results on pressure drop and gas hold-up for gas-liquid flow through packed beds obtained from a second flight on the International Space Station are presented and analyzed. It is found that the gas hold-up is a function of the bed history at low liquid and gas flow rates whereas higher gas hold-up and pressure gradients are observed for the test conditions following a liquid only pre-flow compared to the test conditions following a gas only pre-flow period. Over the range of flow rates tested, the capillary force is the dominant contributor to the pressure gradient and is found to be linear with the superficial liquid velocity but is a much weaker function of the superficial gas velocity. The capillary contribution is also a function of the particle size and varies approximately inversely with the particle diameter within the range of the test conditions.

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