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Linear Attenuation Coefficients and Gas holdup Distributions of Bubble Column with Vertical Internal Bundle for FT Synthesis

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Linear attenuation coefficient distribution, time-averaged cross-sectional gas holdup distribution, and their radial profiles have been measured in 6" (152 mm) Plexiglas bubble columns with and without internals for the air-water system at a superficial gas velocity 45 cm/s by utilizing a gamma-ray computed tomography (CT) technique. 1" (25.5 mm) diameter Plexiglas internals covers 25% of total cross-sectional of the column have been equipped with the column and similar to those using for Fischer-Tropsch (FT) synthesis. The experimental results revealed that the reference scan significantly affects the values of the linear attenuation coefficients and consequently the gas holdup distribution images. The results show that using air (no column) as a reference scan, enhances the accuracy of linear attenuation coefficients and hence the precision of gas holdup results, while using the empty column with internals as a reference scan gives incorrect values for linear attenuation coefficients and gas holdup values. Moreover, using air (no column) as a reference scan had eliminated the error in gas holdup profiles in the wall region. Furthermore, the CT scan images exhibit symmetric gas holdup distributions for bubble columns with and without internals as studied for the superficial gas velocity. Finally, the gamma-ray computed tomography technique was capable of capturing the wall thickness of a column and position of each internal when air (no column) is used as reference scan.

Country/Organization invited to participate

United States of America

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