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Ali Toukan, Vineet Alexander, Hamza AlBazzaz, Muthanna H. Al-Dahhan

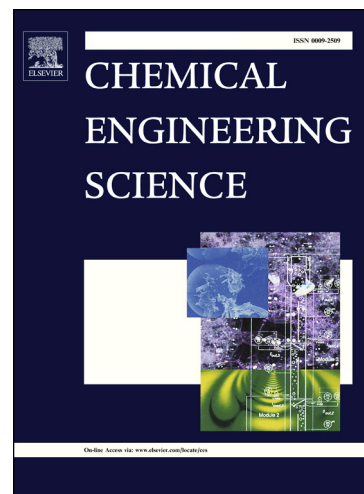
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IDENTIFICATION OF FLOW REGIME IN A COCURRENT GAS – LIQUID UPFLOW MOVING PACKED BED REACTOR USING GAMMA RAY DENSITOMETRY

Ali Toukan¹, Vineet Alexander¹, Hamza AlBazzaz² and Muthanna H. Al-Dahhan^{1*}

^{1*} Department of Chemical & Biochemical Engineering, Missouri University of Science & Technology,

1101 North State Street, 110 Bertelsmeyer Hall Rolla, MO-65409 USA

² Kuwait Institute of Science Research, P.O Box 24885, 13109 Kuwait

Abstract:

Flow regime identification in upflow moving packed bed reactors with the conical bottom was investigated using non-invasive gamma-ray densitometry (GRD) measurement technique. Time domain (Standard Deviation), and state space or chaotic methods (Kolmogorov Entropy) are employed on photon count time series of GRD to determine flow regime. The experiments were performed on a pilot plant scale upflow packed bed reactor made of Plexiglas column of 27.94 cm I.D and a total height of 118 cm including plenums, and it is packed randomly with 0.3 cm diameter catalyst till 79 cm including the conical bottom. Two axial and various radial position are selected to conduct GRD scanning. The measurements are conducted at superficial liquid (water) velocity 0.017 cm/s and superficial gas (air) velocity in the range of 0.6 – 7.7 cm/s under these conditions catalyst bed behaves as packed bed. All analysis showed similar flow regime trend, with observed flow regime as bubbly and pulse flow, when compared with flow regime map for upflow packed bed.

Keywords: Gamma Ray Densitometry, Two Phase upflow moving packed bed, Flow Regime Identification

*Corresponding Author: Muthanna Al-Dahhan Email: aldahhanm@mst.edu

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