Modeling of multiphase flow and heat transfer in microchannel reactor

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Microreactors have been said to give enhanced process intensification due to its reduced mass and heat transfer distances, when compared to conventional technology. In this work, multiphase flow and heat transfer aspects of microchannel reactor are being studied. For applications like Fischer-Tropsch synthesis, either some or all of the reaction products are in liquid phase, thereby adding additional phase to the usual gas phase only reactant or reactant-inert flow. Also, most reactions carried out in microchannel reactor involve substaintial heat effects. Through modeling and simulation of a multiphase flow in a microchannel, one can get insight into the behaviors of such a reactor, and on whose knowledge one can develop a desgin and gain knowledge of tuning parameters for a desired reactor performance. Understanding the heat effect is essential to achieve an efficient coolant or heating system desgin that are the key to the perfermance of such a reactor. This work also attempts to redemonstrate the recent claims by various researchers around the world about microchannel reactor as being a promising alternative to the conventional reactors.

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