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GTL PROCESS AND ITS CATALYSTS: A SYSTEMATIC REVIEW

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Abstract

Gas to Liquid Technology (GTL) enables the chemical conversion of natural gas into high quality ultra-clean synthetic hydrocarbons such as clean diesel, naphtha, kerosene and light oils, which are ready-to-use marketable liquid products. The GTL consists of four processes, namely Gas cleaning, Reforming, Fischer-Tropsch (FT) and Hydrocracking and all these processes require catalysts. The recital of the FT synthesis depends on the gas composition, catalyst composition and operating temperature. In particular, catalysts play a critical role in GTL and furthermore, the catalyst used undergoes chemical and physical changes during the FT synthesis that further complicates the reactor design and optimization. Mainly metal catalysts such as cobalt, iron and nickel are used for GTL with promoters like platinum, palladium, rhodium and ruthenium. Recycling of those catalysts is one of the necessary steps for the refineries from the view of maximizing the economic benefits and minimizing the environmental pollution. The objective of this article is to provide an overall view of GTL catalyst regeneration, recycling, and the kinetics studies of catalyst

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INVESTIGATION OF DIFFERENT RANS TURBULENCE MODELS IN CFD SIMULATION OF BUBBLE COLUMNS INCORPORATING POPULATION BALANCE METHOD FOR GTL PROCESSES

Presenter: Dr Mohammad Reza Khosravi Nikou, Petroleum University of Technology, Iran
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Abstract

Bubble columns are the key equipment in Gas-to-Liquid processes. Understanding the exact hydrodynamics of these equipment can help to design them as exactly as possible. Most of these bubble columns work on churn-turbulent flows, therefore in this study, this flow regimes have been simulated in a cylindrical bubble column reactor using the open source CFD software OpenFoam. A 3D, unsteady, Euler-Euler multiphase mode based on the finite-volume method incorporating population balance equation to account for the effect of different bubble sizes have been carried out. Performance of the different turbulence models in the RANS approach for modeling of turbulence in bubble columns had been discussed in connection with laboratory scale experiments. The results showed that application of population balance for accounting the effect of different bubble sizes in comparison with single bubble size for modeling of hydrodynamics and gas hold-up could be precisely described.