

Heat-exchanged fixed-bed reactor with Co-metal foam catalyst in Fischer-Tropsch synthesis

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One of the most important issues in the Fischer-Tropsch synthesis (FTS) has been heat transfer limitation during the reaction because FTS is very exothermic reaction and the temperature increase inside reactor influences on the catalyst activity and the product distribution. Various types of reactor such as fixed-bed, fluidized-bed, ebulliating-bed, and slurry-phase are considered to efficiently control this exothermic reaction heat. In this study, using heat-exchanged fixed-bed reactor with Co-metal foam catalyst, we improved the heat transfer efficiency inside reactor. Co-metal foam catalyst was made up of the Ni/Cr-metal foam and Co/Al₂O₃ catalyst coated homogeneously on it by atomic layer deposition (ALD) coating system. Furthermore, the heat-exchanged fixed-bed reactor was used to increase the heat removal efficiency by surrounding the reactor with many small pins and increasing the contact area between reactor and heat transfer media.