

Agglomeration Behaviour of FCC – Catalyst-Particles in Spray Drying

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Abstract

Composition of certain crude oils and its availability represent challenges for the oil and the chemical industry. Feedstocks, such as shale oil, have higher amount of metals and heavier components, which causes difficulties for the oil refining and reduce the yield of valuable products in classic refining schemes. Furthermore, increasing energy consumption and the limitation of alternative energy resources encourage studies for modification and optimization of current oil refining processes.

Due to higher concentration of poisoning metals and heavier cuts in refinery feeds, modifications for Fluid Catalytic Cracking catalyst (FCC) are suggested. Aim of this contribution which is part of the project ReCaLI, focuses on the optimization and reuse of spent FCC catalyst from Vietnam.

Formulations of recycled catalysts are realized via spray drying. The agglomeration behavior in the spray dryer is analyzed with respect to the formulated FCC-catalysts. Single component suspensions were prepared in water as well as in acidified solvents (diluted hydrochloric or acetic acid) and dried applying different operational conditions. In addition, different combinations of suspended commercial catalyst components, such as filler, binders, zeolite Y and ZSM-5, were applied. Determination of the particle size distribution were done using laser scattering. The obtained results indicate that particle agglomeration does not depend under our conditions on the solid species but on the properties of the applied solvent for the suspension and its interaction with the solids.

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