

**Dissolution of Spent Fluid Catalytic Cracking Catalyst (FCC Catalyst):
Investigation of Dissolution Behaviour for Production of Synthesis Matrices**

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Abstract

In the process of fluid catalytic cracking, tons of spent catalyst are substituted daily after cycling in the reactor and regenerator. Current extraction processes to remove rare-earth elements cause huge amounts of solid waste. The residues after leaching are either used as additives in cement or deposited in landfills.

The aim of this work is a complete dissolution and reuse of spent catalyst components after the separation of metals and the recycling of rare-earth elements.

The resynthesis of FCC catalyst requires several conditions after the dissolution processes, such as i) contaminants must be separated from the catalyst, ii) used acid or alkaline solution are expected to not impair the resynthesis (e.g. of zeolites), iii) the obtained solutions must have a defined composition after the dissolution and purification process.

Our investigations include the dissolution behaviour of spent FCC catalyst in various acidic and alkaline solutions applying different temperature regimes and hydrothermal conditions. Thus, the goal is to achieve selective and stepwise dissolution of spent FCC catalyst in order to obtain poison free feedings solutions for the direct synthesis of FCC catalysts.

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