

# CATALYTIC OXIDATIVE DESULFURIZATION FOR A CLEANER ENVIRONMENT

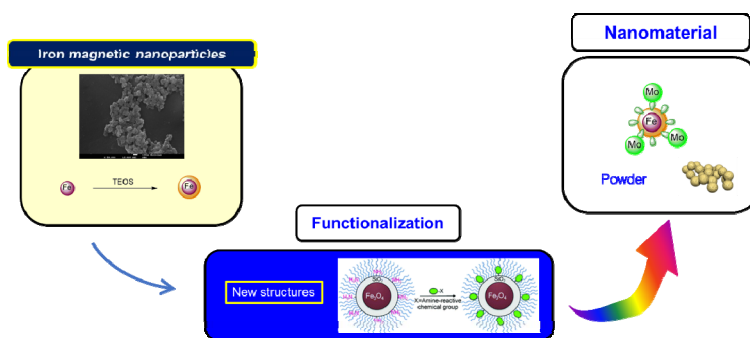
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Producing green fuels is of utmost importance due to increased awareness of the adverse effects of burning sulfur containing fuels on human health and the environment. Therefore, removal of sulfur compounds is imperative to produce green fuel oils and meet the new requirements of legal sulfur content (10–15 ppm).[1] Oxidative desulfurization (ODS) is considered as a promising and highly efficient method owing to its mild operation conditions and high efficiency.[2] Generally, ODS includes two steps: (1) an appropriate oxidizing agent oxidizes the organic sulfur compounds to sulfoxides and sulfones; (2) removal of the oxidation products by suitable methods.

The ODS catalysts reported so far were metal oxides, titanosilicates, polyoxometalates (POMs), metal complexes, metal-organic frameworks (MOFs), and metal-free catalysts. Recent interest in nanoparticles (NPs) has increased due to their unique physicochemical properties and potential applications.[3,4]  $\text{Fe}_3\text{O}_4$  NPs functionalized with  $\text{MoO}_3$ , Figure 1, were used in the desulfurization process of sulfides. Variables such as the type of oxidant (*tert*-butyl hydroperoxide or  $\text{H}_2\text{O}_2$ ) as well as the substrate:oxidant ratio (1:1 or 1:2 mmol) were assessed, while testing different substrates.

Promising results were achieved and it was found that oxidation to sulfoxide and later to sulfone occurred. Catalyst recovery was also possible through a magnet, taking advantage of the  $\text{Fe}_3\text{O}_4$  properties, and after the removal of catalyst the solution was clear. The most promising catalytic reactions to obtain the sulfone were those that used TBHP as oxidizing agent. [1].



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