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Synthesis and characterization of new nano organic-inorganic hybrid film $(TBA)_4PW_{11}Fe@TiO_2@PVA$ for oxidative desulphurization of gasoline

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Abstract

Oil pollution is one of the causes of air pollution, which will have harmful effects on human health. Also, in addition to the presence of sulfur compounds, especially mercaptans, in oil cuts, it causes environmental pollution, but it also causes corrosion in transmission lines and storage tanks. Therefore, it is necessary to adopt appropriate methods to remove the amount of sulfur and mercaptans in oil cuttings up to international standards [1-4].

In this work, an efficient oxidative desulfurization (ODS) process of real gasoline was introduced using $(TBA)_4PW_{11}Fe@TiO_2@PVA$ as catalyst. The catalyst was successfully prepared by saturated and substituted Kegini structure such as $(TBA)_4PW_{11}Fe$) and stabilized on titanium dioxide (TiO_2) and polyvinyl alcohol (PVA), by sol-gel method. The composite was characterized using various analytical techniques including FT-IR, UV–vis, XRD, and SEM. The effects of various parameters such as: amount of catalyst, type of catalyst, type of oxidizer, temperature and time in desulfurization were investigated. The synthesized nanocomposites showed the ability to desulfurize real gasoline with high efficiency. The results showed that the desulfurization process with synthesized polyoxometalates has advantages such as low cost, simplicity and environmental friendliness.

Keywords: Oxidative desulfurization, Polyoxometalate, Gasoline, Catalyst

Introduction

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