

Deep desulphurization of gasoline and diesel fuels using non-hydrogen consuming techniques.

Ali, Mohammad Farhat; Al-Malki, Abdullah; El-Ali, Bassam; Martinie, Gary; Siddiqui, Mohammad N. Department of Chemistry, King Fahd University of Petroleum and Minerals, Dhahran, Saudi Arabia. Fuel (2006), 85(10-11), 1354-1363.

Abstract

Desulphurization of FCC gasoline and diesel fuels was investigated by chem. oxidn. of sulfur contg. compds. with hydrogen peroxide in the presence of an acid catalyst such as formic acid and acetic acid, followed by extn. of the oxidized compds. using acetonitrile. Oxidative desulphurization (ODS) of diesel fuel was promising approach for the redn. of up to 92% of sulfur at low temp. (50°) and atm. pressure. The direct extn. of diesel oil without any oxidn. has resulted in .apprx.45% sulfur removal, however such direct extn. also removed other arom. hydrocarbons and affected the yield. The ODS is not successful with FCC gasoline due to the high olefinic content that tends to react with hydrogen peroxide to form epoxides. GC-MS technique was used to identify the sulfones during the oxidn. of thiophenes. This study recommends that the oxidn. extn. technique be used as an addnl. process to the hydrodesulphurization to enable the refiners to meet the future environmental sulfur regulations. The conventional hydrodesulphurization can be used to lower the sulfur content to few hundreds ppm. Then, the oxidn./extn. approach needs to be used to go for ultra-deep desulphurization as it may provide better mean and cost effective way to meet the future sulfur environmental requirements.