

## New methods of direct desulphurization of crude oil

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Desulphurization of Crude Oil has been investigated using three different methods. Studies on oxidative desulfurization of Saudi crude oil were carried out through  $H_2O_2$ -organic acids system, and the S-containing compounds in crude oil were changed to sulfoxide compounds that can be removed from oil phase by appropriate polar solvent. The influence of variables on the oxidative desulfurization of Saudi crude oil, which contained the selection of oxidant, the amount of oxidant, the ratio of oxidative agents, oxidizing temperature, oxidizing time, the choice of extracting agent and the oxidant /oil ratio were investigated and optimized.

The study of electrochemical desulfurization using Sn-Sb intermetallic compound which is a kind of new functional desulphurization material was recently studied. Because of the special surface defect structure, the destructive desulfurization for W/O emulsion happened with the presence of electric field. Coupling with the electric desalting and dehydration process of crude oil, the pre-desulfurization was realized at room temperature and atmosphere pressure. This method showed that the desulfurization efficiency for crude oil could be improved by increasing the surface ratio of Sn-Sb particles and the highest efficiency could reach up to 28.2%.

Adsorption desulfurization of crude oil has been investigated using desulfurizer with bifunctional materials. The desulfurization reaction was conducted by adding the prepared desulfurizer—base/AC into Saudi medium crude oil. The preparation of the desulfurizer, which is bifunctional including physical and chemical adsorption and can be used directly into the crude oil. The sulfur content of Saudi medium crude oil before and after reaction was analyzed by tubular oven in order to evaluate the performance of the prepared desulfurizer.

### Biography

Raja AL-Otaibi graduated from King Saud University (B.Sc.) in general chemistry in 2000, and then went on to obtain a M.Sc. in catalysis from the University of Liverpool in 2005. He obtained his Ph.D. in heterogeneous catalysis from Cardiff University in 2010 working in the field of heterogeneous catalysis for alkane oxidation. Raja became an assistant research professor in the Petrochemical Research Institute in KACST. His research interests are primarily centered around: heterogeneous catalysis and, particularly, the explanation of structure-activity relationships in oxidation reactions catalyzed by metal oxide catalysts; development of new catalysts for selective oxidation reactions, focusing on utilization of short-chain alkanes, aromatics and bio-renewables; improved methodologies for preparing catalysts and characterization of catalysts using a broad range of analytical techniques and in situ methodologies.

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