

Estimation of the Desulphurization Degree in Light Cycle Oil Using FTIR Spectroscopy

Vesislava Toteva, Anton Georgiev, Liliana Topalova, Sergei Andreev

*University of Chemical Technology and Metallurgy, 8 "St. Kliment Ohridski" Blvd., Sofia 1756, Bulgaria
e-mail: vesislava_t@mail.bg*

One of the world's ecological topics is reducing the sulphur content in the diesel fuels. They are still among the main polluters of the environment with sulphur oxides (SO_x). The current specification in Europe and the USA calls for a maximum sulphur content of 15 ppm, and this level will be reduced to below 10 ppm by the year 2009. In Bulgaria from 01/01/2007 the sulphur in diesel should not exceed 50 ppm.

The aim of the present work was to (i) investigate the possibilities for desulphurization of light cycle oil (component of diesel fuel) by chemical oxidation of sulphur compounds to their respective sulfones, followed by extraction of the oxidized compounds using selective solvents; (ii) determination of the extracted products from the light cycle oil and effectively of desulphurization using FTIR spectral analysis. The suggested method is specific for selective oxidation of sulphur compounds and has no oxidation of aliphatic and aromatic hydrocarbons. By FTIR spectroscopy the quantity and quality of sulfones have been determined at 1304 cm^{-1} . It's was determined ratio between sulfones and sulfoxides $1030\text{-}1060 \text{ cm}^{-1}$ (intermediate product of sulfur compounds oxidation) in the absorbance spectra. Sulfones have a much higher polarity than the parent sulphide molecules, and thus are preferentially extracted from the feed. FTIR analysis allows estimating degree of the oxidation of sulphur compounds, degree of desulphurization by extraction method and registered micro quantity of oxidized products.