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Editorial

Spectroscopy in Fuels

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The special issue aims to provide contributions from spectroscopic technologies relating to the characterization of composition of fuels, evaluation of contamination emission, and the monitoring of fuels during thermal, physical, chemical, and biochemical conversion processes.

The special issue presents seven papers relating to biomass, jet fuel, coal, and so on. We feel that the published articles represent a certain wide range of researches in the scope of special issue. A series of analytical techniques like X-ray diffraction, Fourier-transform infrared spectroscopy, and mass spectrometry were included in the researches. This special issue is dedicated to the readers in the research fields of analytical chemistry, biochemical engineering, chemical engineering, material engineering, and mineral engineering.

In Y. Huang et al.'s paper, the microstructure, mineral composition, and precipitation of heavy metal elements of coal gangue with different weathering degrees were analyzed by electron microscopy and X-ray diffraction. The precipitation mechanism for heavy metals was revealed.

Trace water in jet fuel was characterized by thermometric titration in J.-Q. Hu's paper. The optimal detection system is 2,2-dimethoxypropane as titrant, cyclohexane, and isopropanol as titration solvents and methanesulfonic acid as catalyst. Rapid and accurate determination of trace water in a jet fuel can be realized by thermometric titration.

X-ray diffraction and gas chromatography/mass spectrometry were applied in R. Wang's research to characterize the Fe_2S_3/activated carbon catalyst and catalytic hydroconversion products of a coal, respectively. The results suggested that the catalyst could effectively catalyze the cleavage of C-C-bridged bonds in the coal.

The hydrotreating process of vegetable oil involves the transformation of vegetable oil triglycerides into straight-chain alkanes. J. García-Dávila et al. used Fourier-transform infrared spectroscopy and mass spectrometry to analyze the products of hydrotreating reaction from *Jatropha curcas* seed oil triglycerides.

H. Yang et al. reported an easily controlled method, electronic controlling, for fabricating regular nanotextures on an electrodeposited Ni-Co alloy, which was achieved using atomic force microscope. The friction force decreased when using different nanotextures in an external electric field.

T. Yao et al. investigated the deterioration mechanism of diester aero lubricating oil at high temperatures. Structures of the deteriorated lubricating oils were analyzed by gas chromatograph/mass spectrometry. Deterioration of aero lubricating oil at high temperatures included thermal pyrolysis, oxidation, and polymerization, with the generation of a variety of products such as alcohols, aldehydes, acids, and esters, which caused the deterioration of physicochemical properties of the aero lubricating oil.

Structural characterization of lignin and its degradation products with spectroscopic methods was reviewed by Y. Lu et al. Various spectroscopic methods, such as ultraviolet spectroscopy, Fourier-transformed infrared spectroscopy, Raman spectroscopy, and nuclear magnetic resonance

(NMR) spectroscopy, for the characterization of structural and compositional features of lignin were summarized. Various NMR techniques, such as ^{1}H, ^{13}C, ^{19}F, and ^{31}P, as well as 2D NMR, were highlighted for the comprehensive investigation of lignin structure.

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