

# STUDY ON THE CONVERSION OF WASTE PLASTICS/PETROLEUM RESID MIXTURES TO TRANSPORTATION FUELS

\*Mohammad Farhat Ali, Mohammad Nahid Siddiqui and S. Halim Hamid Redhwi

Department of Chemistry

King Fahd University of Petroleum & Minerals

Dhahran 31261, Saudi Arabia

\*Corresponding Author      Phone: (966)-3860-2145

Fax: (966)-3860-4277      E-mail: [mfali@kfupm.edu.sa](mailto:mfali@kfupm.edu.sa)

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## **ABSTRACT**

Catalytic coprocessing of model and waste plastics with the light Arabian crude oil residue was investigated using NiMo/Al<sub>2</sub>O<sub>3</sub>, ZSM-5, FCC and hydrocracking catalysts. Reaction systems that were studied included low-density polyethylene (LDPE), high-density polyethylene (HDPE), polystyrene (PS) and polypropylene (PP). A series of single (plastic/catalyst) and binary (plastic/resid/catalyst) reactions were carried out in a 25-cm<sup>3</sup> micro autoclave reactor under different conditions of weight and type of catalysts, time duration, pressure and temperature. The optimum conditions selected for our work were: 1% catalyst by weight of total feedstock weight, time 60 minutes, pressure 8.3 Mpa and temperature 430 °C. The product distribution for the binary system using plastic and petroleum residue provided some encouraging results. High yields of liquid fuels in the boiling range 100-480°C and gases were obtained along with a small amount of heavy oils and insoluble material such as gums and coke. In general, the study helps to demonstrate the technical feasibility for upgrading both waste plastics and petroleum resid and alternative approach to feedstock recycling.