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Co-pyrolysis of oil shale and High density polyethylene: Structural characterization of the oil

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This study describes a detailed characterization of the oil obtained by co-pyrolysis of Tarfaya oil shale (Morocco) and high density polyethylene (HDPE) and by pyrolysis of oil shale and HDPE individually. The oil (obtained under the most suitable conditions, temperature of 500-525 °C and heating rate of 10 °C/min) was characterised by elemental analysis, nuclear magnetic resonance spectroscopy (1H NMR) and Fourier transform infrared spectroscopy (FTIR). In addition, column chromatography was used group composition of oil was determined. Gas chromatography was achieved on n-hexane fractions. Adding HDPE to the oil shale results in increased oil yields, which indicates synergetic effect between the oil shale and HDPE. The addition of HDPE to oil shale improved fuel properties of shale oil leading to a decrease in the oxygen content of shale oil. The results show that the oil obtained by co-pyrolysis has similar properties with commercial gasoline. HDPE acts as a hydrogenation medium for the oil shale product as revealed by FTIR results.

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