

Application of pyrolysis molecular beam mass spectrometer and multivariate analysis to characterize oil shale

Eun-Jae Shin, Robert J. Evan, Andrew M. Herring, Department of Chemical Engineering; Mike Batzle, Department of Geophysics, Colorado School of Mines, Golden, CO

The potential of oil shale is enormous but numerous technical difficulties remain before the recovery processes become economically viable. Pyrolysis-molecular beam mass spectrometer (Py-MBMS) was used to characterize chemical composition of eight different oil shales and their extracts and multivariate factor analysis was employed to simplify the data and discover underlying differences in chemistry that distinguish one type of oil shale from others due to its characteristics. The objective of this work is to investigate the possibility of developing a model to predict physical properties of their extracts from their chemical composition using the techniques described above. Using these rapid screening techniques, it was possible to separate and/or group eight types of oil shale and their extracts based on their chemical differences and similarities. The results show the potential of these techniques as tools for rapid characterization of oil shale.