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Realistic Oil Shale Pyrolysis Programs: Kinetics and Quantitative Analysis

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Detailed knowledge of the pyrolysis process is needed to relate properties of native state oil shale, determined from drill core and well logs, to optimal oil shale conversion process parameters. We employ realistic temperature and pressure programs in the laboratory to generate oil shale pyrolysis products representative of downhole processes. In initial experiments, we have used oil shale obtained from the Mahogany ledge, exposed along the southern Cathedral Bluffs, Colorado. Homogenized replicate samples were heated in an oven, using predetermined temperature programs that spanned varying amounts of time. Gaseous and liquid pyrolysis products were collected, and analyzed using gas chromatography. The spent shale was studied using 2 MHz proton magnetic resonance, both before and after solvent extraction. Results are in qualitative agreement with kinetic equations and constants found in the literature.