

## 8.2 **Second and modified-variable order kinetic models of oil shale and kerogen pyrolysis**

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Kinetics of oil shale and de-mineralized kerogen pyrolysis were determined for Jordanian oil shale using a thermogravimetric analyzer. Kinetic experiments were conducted with heating rates of 1, 3, 5, 10, and 30°C min<sup>-1</sup>. The activation energies and pre-exponential factors were initially determined using the Coats and Friedman equation for a second order reaction. In this case, the activation energies were found to vary with heating rate. The kinetic data was further analyzed using a variable reaction order model, in which the reaction order was a function of the rate of mass loss. The variable order model led to a significant improvement in the agreement between the model results and the experimental data. Interestingly, the reaction order in the variable-order model was at a minimum when the mass loss rate was greatest.