20.12 **Thermal Analysis of Huadian Oil Shale with Isoconversional Method**

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Thermal analysis is a useful means to provide necessary information on the reactivity of samples, and thus is widely applied. Apparent activation energy, Frequency factor and reaction mechanisms are the three key parameters to characterize a pyrolysis process. The popular model-fitting approach gives excellent fits with the related pyrolytic experiments but probably yields highly unreliable values of the corresponding parameters due to the close association of T variation with the related mass change in an actual non-isothermal pyrolytic process, as well as the fact that pyrolysis of solid samples may proceed through different reaction steps instead of a single general elementary reaction. Therefore, the model-free approach *i.e.,* the isoconversional method, is recommended as a trustworthy way to obtain reliable information from an actual non-isothermal pyrolytic process in this research. The thermal decomposition of Huadian oil shale samples was studied by thermogravimetric analysis (TG, DTG) at different heating rates (*i.e*., 10, 20, 40,100°C/min) under a nitrogen environment. The apparent activation energy in pyrolysis reactions of three kinds of oil shale samples has been analyzed by the Friedman method, a typical isoconversional method. Furthermore, Sestak's complex mechanism was adopted with the aim to obtain the pyrolysis reaction mechanism of oil shale. The results showed that although the activation energy is not a constant in the conversion rate range of 0.1-0.9 the activation energy changes slightly. In addition, oil shale pyrolytic mechanisms were complex and mainly attributed to the nuclear mechanism.