20.11 **Thermobituminizing Kinetics Of Estonian Oil Shale at Low-Temperature Pyrolysis**

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A step-by-step mathematical model was deduced for description of the co-effect of time, temperature and heating rate at low-temperature (370-410°C) on the yield of kukersite pyrolysis products in a laboratory retort. According to the scheme applied the parallel formation of thermobitumen and volatiles from kukersite, and parallel-consequent formation of volatiles and coke from the thermobitumen formed were approximated to first order kinetic reactions. The algorithms for estimation of the corresponding rate coefficients k_1–k_4 were proposed. The values of apparent activation energy (E_1-E_4) and frequency factor (A_1-A_4) were calculated using the temperature dependencies of the rate coefficients estimated on the basis of experimental results obtained at isothermal retorting. A kinetic compensation effect was revealed between the bulk of kinetic constants found: $\ln A = 0.176(\pm 0.009)E - 2.59(\pm 2.29)$. The share factors and their temperature dependencies for distribution of malthenes and asphaltenes in thermobitumen, and gas and oil in volatiles were found from the experimental results of kukersite low-temperature retorting. The effect of time on the yield of the products predicted introducing the constants found into the model deduced agreed satisfactorily with the experimental results obtained by retorting of kukersite under non-linear increase of temperature up to 370-410°C and keeping the shale for 20-60 minutes under the nominal temperature.