

APPLICATION OF A NEW METHOD FOR THE EVALUATION OF NON-
ISOTHERMAL KINETICS OF CALCIUM OXALATE HYDRATE DECOMPOSITION

V. Balek¹, I.N. Beckman², A.A. Shviryaev² and W.D. Emmerich³

¹ Nuclear Research Institute, 250 68 Řež, Czechoslovakia

² Department of Radiochemistry and Chemical Technology, Moscow State University, 199234 Moscow, U.S.S.R.

³ NETZSCH, Ltd., P.O. Box 1460, 8672 Selb, F.R.G.

Numerous methods were proposed for evaluation of the kinetics of thermal decomposition studied by thermogravimetry. These methods require experimental data obtained either isothermally at various temperatures or non-isothermally at various heating rates.

In this paper a new method for the evaluation of non-isothermal TG measurement of Calcium Oxalate Hydrate is applied. The method is based on the use of functional scales for linearization of the TG curve. The slope of the linear part of the curve gives directly the value of the activation energy of the process.

Several model curves for solid state reactions of the 1st and 2nd order, diminishing sphere kinetics and some other cases were computed. The experimental data of Calcium Oxalate Hydrate decomposition in air obtained by NETZSCH microthermobalance were fitted into the model curves. The model curve for the 1st order solid state reaction fits the best with the experimental data.

The suggested method enabled us to determine the kinetic model and activation energy of the thermal decomposition of Calcium Oxalate Hydrate using the TG data from a single non-isothermal heating. By this method all experimental points are used for the evaluation of solid state reaction. The application of the model TG curve in the linearized form considerably simplifies solution of tasks of the kinetics of solid state reactions.