The kinetics of isothermal decomposition of Cu(CH$_2$CH$_2$COO)$_2$ were studied at 483–503 K. The end-product was identified as CuO by X-ray diffraction and chemical analysis. The kinetics follow the Prout—Tompkins equation with an activation energy of 191 ± 10 kJ/mole. The activation energies and the order of reaction were also evaluated from analysis of the DTG, DTA and TG curves of the sample.

Much work is currently being done on the isothermal decomposition reactions of transition metal carboxylates [1]. Recently, the thermal decomposition of copper carboxylates [2, 3] have been studied by differential thermal techniques. The thermal decompositions of Cu(II) benzoate, Cu(II) salicylate and Cu(II) malonate have recently been reported by Bassi and Kalsi [4, 6]. The present work deals with the kinetics of isothermal decomposition of Cu(II) adipate. For the isothermal decomposition, the rate of the reaction was followed by the thermal method, while the decomposition products were analyzed by chemical analysis and X-ray diffraction.

Material and methods

Cu(II) adipate was prepared as reported earlier [7]. The composition of the anhydrous sample was determined by analyzing the sample gravimetrically by precipitating copper as cuprous thiocyanate [8] and by microanalysis of carbon and hydrogen. The carbon and hydrogen were found to be 34.3 and 3.7% (calculated: C = 34.6 and H = 3.8%), respectively. The sample taken for the isothermal decomposition studies was homogenized by sieving below 100 mesh. A known weight of the sample was taken in a silica crucible and placed in a thermostat set at a constant temperature within ± 0.2°. The change in weight was noted after different intervals of time till no further loss in weight. The final decomposition product was found crystalline under a polarizing microscope and by X-ray diffraction.

Thermal analysis were carried out by means of a Paulik – Paulik – Erdey MOM derivatograph (Hungary). The weight of the sample was 250 mg. The curves were recorded at a heating rate of 10°/minute.
Results and discussion

Isothermal decomposition

Plots of loss in weight versus time $t$ at various temperatures for Cu(II) adipate are given in Fig. 1. The decomposition was studied at 483, 493 and 503 K. At 483 K, the reaction was complete after 14 hours and the weight loss corresponded to the formation of cupric oxide. The decomposition product was further identified (to be CuO) by chemical analysis, by precipitating Cu as CuSCN [8], and

![Graph showing plots of loss in weight versus time at various temperatures for the isothermal decomposition of Cu(II)-adipate]

Fig. 1. Plots of loss in weight versus time at various temperature for the isothermal decomposition of Cu(II)-adipate

![Graph showing the test of Prout–Tompkins equation for the thermal decomposition of copper adipate]

Fig. 2. Test of Prout–Tompkins equation for the thermal decomposition of copper adipate

J. Thermal Anal. 13, 1978