Influence of Sample Particle Size and Heating Rate on the Thermal Decomposition of K2C2O4

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Abstract
The thermal decomposition of K2C2O4 in a current of dry nitrogen according to the reaction (1) $$K_2 C_2 O_4 \to K_2 CO_3 + CO$$ is shown to be influenced profoundly by the sample particle size and the heating rate. For finely ground samples, a lower activation energy (E a =255.15±5 kJ mol−1) is obtained as compared with the 312.6±6 kJ mol−1 observed for crystal chips weighing 30–40 mg. The characteristic temperatures (the reaction start, peak and end temperatures) are markedly reduced by fine grinding. High heating rates tend to separate the thermal decomposition process into two kinetic phases, shown by splitting of the DTG peak. The significance of these observations is discussed, and the results are theoretically accounted for.