Measurement of the Thermal Properties of $Co(NO_3)_2$ and Acetamide by a Modified AC-Heated Wire Technique

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A modified AC-heated wire technique has been used for the measurement of thermal activity (b), thermal diffusivity (a). volumetric heat capacity (ρC_p) and the thermal conductivity (λ) of nitrate salt $Co(N0_3)_2$ in the temperature range 30-120°C and acetamide CH_3CONH_2 in the temperature range 50-90 °C. DSC investigations have been also performed for both substances.

The results for $Co(N0_3)_2$ show that (a) slightly decreases, (ρC_p) increases but λ remains constant in the measured temperature range. For acetamide, (a) slightly decreases, (ρC_p) increases, and (λ) increases with temperature, but all of them do not change appreciably on melting. The obtained values for λ for both substances show that the main mechanism of heat transport is due to phonons as expected.

The upper limit of the investigated temperature ranges was dictated by the occurrence of unbalance of the measuring system and disappearance of the third harmonic signal. This observation requires further investigations to find out the reason behind it, especially because the same phenomenon has been observed for some other salts.