^{1}H NMR Studies on the Cation Motions in Crystalline Cadmium Bromide Complexes $[C(NH_2)_3]Cd_2Br_5$, $[(CH_3)_3NH]_3Cd_2Br_7$, and $[i\text{-}C_3H_7NH_3]CdBr_3$

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^{1}H NMR T_1 measurements of crystalline $[C(NH_2)_3]Cd_2Br_5$ showed a single minimum due to the C_3 reorientation of the planar $[C(NH_2)_3]^+$ ion with an activation energy (E_a) of 35.8 kJ mol^{-1}. In $[(CH_3)_3NH]_3Cd_2Br_7$ crystals, two T_1 minima appeared which are assigned to the C_3 reorientation of methyl groups in the $[(CH_3)_3NH]^+$ cation with E_a = 13.0 kJ mol^{-1} and to the C_3 reorientation of a whole cation around the molecular C_3 axis with E_a = 28.9 kJ mol^{-1}. In $[i\text{-}C_3H_7NH_3]CdBr_3$ crystals, a very broad T_1 minimum appeared near 160 K which is assigned to the C_3 reorientations of two methyl groups with E_a = 11.3 kJ mol^{-1} and of an NH_3 group with E_a = 13.3 kJ mol^{-1} in the $[i\text{-}C_3H_7NH_3]^+$ ion, and another minimum with E_a = 23.5 kJ mol^{-1} near 300 K assigned to a higher order molecular motion of the cation.

Key words: ^{1}H NMR, T_1, DSC, Phase Transition, Cationic Motion