Isolated versus Condensed Anion Structure V: X-ray Structure Analysis and $^{81}$Br NQR of t-butylammonium tribromocadmate(II)-1/2 water, i-propylammonium tribromocadmate(II), and tris-trimethylammonium heptabromodicadmate(II)

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The crystal structures of the condensed bromocadmate anions with chains built of $[\text{CdBr}_3]$ were determined by X-ray structure analysis at 300 K. In addition, the temperature dependence of the $^{81}$Br NQR frequencies was observed. $[(t-C_4H_9NH_3)\text{CdBr}_3]_2\text{H}_2\text{O}$ (1) crystallizes with a double Br bridged chain (monoclinic, $P2_1/c$, $Z = 4$, $a = 1963.4(8)$ pm, $b = 887.7(4)$ pm, and $c = 1432.1(6)$ pm, and $\beta = 110.66(2)^\circ$). Six $^{81}$Br NQR lines are observed at temperatures between 77 and 330 K. $((i-C_3H_7NH_3)\text{CdBr}_3$ (2) crystallizes with a triple Br bridged chain (orthorhombic, $Pbc_a$, $Z = 8$, $a = 1975.4(6)$ pm, $b = 1415.8(4)$ pm, and $c = 690.1(2)$ pm). (2) shows three $^{81}$Br NQR lines at temperatures between 77 and 193 K. A phase transition occurs at 224 K. The structure of $[(\text{CH}_3)_3\text{NH}_3\text{Cd}_2\text{Br}_7$ (3) was redetermined. (3) consists of a triple Br bridged chain and a discrete $[\text{CdBr}_4]$ tetrahedron (hexagonal, $P6_3mc$, $Z = 8$, $a = 1483.5(2)$ pm, and $c = 685.7(5)$ pm). The structure of (3) is identical to the one reported by Daoud, Perret, and Dusausoy, Acta Crystallogr., B35, 2718 (1979). Three $^{81}$Br NQR lines are observed at temperatures between 77 and 243 K.