Crystal Structures of Piperazinium Tetrahalogenometallates (II) $[C_4H_{12}N_2]MX_4$ (M = Zn, Hg; X = Br, I)

Hideta Ishihara[a], Keizo Horiuchi[b], Ingrid Svoboda[c], Hartmut Fuess[c], Thorsten M. Gesing[d], J.-Christian Buhl[d], and Hiromitsu Terao[e]

[a] Faculty of Culture and Education, Saga University, Saga 840-8502, Japan
[b] Faculty of Science, University of the Ryukyus, 1 Senbaru, Okinawa 903-0213, Japan
[c] Materiales Science, University of Technology, Petersenstraße 23, D-64287, Darmstadt
[d] Institut für Mineralogie, Universität Hannover, Welfengarten 1, D-30167 Hannover
[e] Faculty of Integrated Arts and Sciences, Tokushima University, Tokushima 770-8502, Japan

Reprint requests to Prof. H. Ishihara. E-mail: isiharah@cc.saga-u.ac.jp

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The crystal structures of piperazinium tetrahalogenometallates (II) $[C_4H_{12}N_2]MX_4$(M = Zn, Hg; X = Br, I), orthorhombic with space group $P2_12_12_1$ and $Z = 4$ are isostructural with $[C_4H_{12}N_2]CdI_4$. The structure consists of piperazinium cations and isolated tetrahedral MX_4 anions. $[C_4H_{12}N_2]ZnBr_4$ (**1**): $a = 850.4(2)$, $b = 1146.5(3)$, and $c = 1228.4(4)$ pm at 300(2) K, $[C_4H_{12}N_2]ZnI_4$ (**2**): $a = 886.89(6)$, $b = 1209.11(9)$, and $c = 1293.79(9)$ pm at 223(2) K, $[C_4H_{12}N_2]HgBr_4$ (**3**): $a = 865.48(14)$, $b = 1158.7(3)$, and $c = 1233.3(2)$ pm at 293(2) K, $[C_4H_{12}N_2]HgI_4$ (**4**): $a = 899.6(2)$, $b = 1230.0(2)$, and $c = 1299.5(3)$ pm at 293(2) K. All crystals show a structural phase transition at about 560 K and decomposition temperatures above 600 K. The lattice stability of the crystals is well explained by N-H$\cdots$X hydrogen bond networks.

Key words: Crystal Structure, Hydrogen Bond, Piperazinium Tetrahalogenometallates (II), DSC, Phase Transition