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Triiodomethane Adducts, Tetraphenylphosphonium Halides, σ-Donor/Acceptor and Phenyl/Phenyl Interactions

Three donor/acceptor complexes between halide anion donors and the triiodomethane acceptor with tetraphenylphosphonium countercations, $\{(H_5C_6)_4P^{\oplus}X^{\ominus} \cdots I_3CH)\}$ ($X^{\ominus}$ = $Cl^{\ominus}$, $Br^{\ominus}$, $I^{\ominus}$) could be crystallized and their structures determined at low temperature. Their crystal packing motifs are donor/acceptor layers of halide anion/triiodomethane patterns and phenyl/phenyl interacting tetraphenylphosphonium cation chains. Structure comparison and discussion are based on literature-known analogous adducts with organoammonium salts as well as the phenyl/phenyl interactions in the numerous tetraphenylphosphonium salts registered in the Cambridge Structural Database. The results add novel facets to the selforganization phenomena observed on crystallization of halogen compounds and halide salts.