Preparation and Crystal Structures of \((\text{Hg}_3\)(\text{PO}_4)\text{Cl), (Hg}_3\)(\text{AsO}_4)\text{Cl and (Hg}_3\)(\text{AsO}_4)\text{Br – Mercury Compounds with the Triangular Hg}_3^{4+} \text{ Cluster}\)

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The compounds \((\text{Hg}_3\)(\text{PO}_4)\text{Cl), (Hg}_3\)(\text{AsO}_4)\text{Cl and (Hg}_3\)(\text{AsO}_4)\text{Br have been prepared under hydrothermal conditions at 200 °C, starting from stoichiometric mixtures of the corresponding mercury halides and mercury phosphates or arsenates, respectively. The formula (Hg}_3\)(\text{AsO}_4)\text{Cl is identical with that of the mineral kuznetsovite. All compounds are isotypic and crystallize with four formula units in the space group } P2_1 3 [(Hg}_3\)(\text{PO}_4)\text{Cl: } a = 8.2912(5) Å; (Hg}_3\)(\text{AsO}_4)\text{Cl: } a = 8.3983(6) Å; (Hg}_3\)(\text{AsO}_4)\text{Br: } a = 8.4611(5) Å]. All crystal structures have been refined from single crystal diffractometer data sets under consideration of merohedral twinning according to a diagonal mirror plane as twin element. The structures comprise of equilateral mercury triangles with mean distances \(\overline{\text{d(Hg-Hg)}} = 2.659 \text{ Å}, which are bonded to halogen and oxygen atoms of nearly perfect \text{PO}_4 or \text{AsO}_4 tetrahedra, respectively.}