Complex Chalcogenides of the IVa Metals with Low Dimensional Anionic Partial Structures.

Preparation and Crystal Structures of $\text{K}_2\text{ZrTe}_3$ and $\text{Rb}_2\text{ZrTe}_3$

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The isostructural compounds $\text{K}_2\text{ZrTe}_3$ and $\text{Rb}_2\text{ZrTe}_3$ were obtained at 1000°C by reacting $\text{K}_2\text{Te}$ and $\text{Rb}_2\text{Te}$ with stoichiometric amounts of Zr and Te. The compounds are monoclinic, $\text{mP2}_1/c$, space group $\text{P2}_1/c$, $Z = 4$ with $a = 9.089(3)$, $b = 14.148(4)$, $c = 6.986(3)$ Å, $\beta = 105.90(1)^\circ$ and $a = 9.735(4)$, $b = 14.300(7)$, $c = 6.952(8)$ Å, $\beta = 108.61(2)^\circ$, respectively. The crystal structure was determined from diffractometer data and refined to $R = 0.030$ for 1452 Fo's for $\text{K}_2\text{ZrTe}_3$ and $R = 0.038$ for 1131 Fo's for $\text{Rb}_2\text{ZrTe}_3$. The crystal structure is of a new type, characterized by infinite anionic chains, $\frac{1}{\infty}-[\text{ZrTe}_3]^{2-}$, built up by octahedra sharing opposite faces which run along [001]. The mean Zr-Te bond lengths are 2.921 and 2.920 Å, respectively. The alkali cations separating the chains are characterized by two different - distorted octahedral and pentagonal bipyramidal - chalcogen environments.

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