

Syntheses and Crystal Structures of $\text{RE}_2\text{As}_4\text{O}_9$ ($\text{RE} = \text{Nd}, \text{Sm}$): Oxo-Arsenates(III) according to $\text{RE}_4(\text{As}_2\text{O}_5)_2(\text{As}_4\text{O}_8)$ Exhibiting the Cyclic $\text{As}_4\text{O}_8^{4-}$ Anion

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Dedicated to Professor Gerhard Thiele on the occasion of his 70th birthday

Single crystals of light violet $\text{Nd}_2\text{As}_4\text{O}_9$ and yellow $\text{Sm}_2\text{As}_4\text{O}_9$ were obtained from the reactions of the respective lanthanide oxides with As_2O_3 in a NaCl flux at 850 °C in sealed silica ampoules. According to the structure determination, the triclinic compounds ($P\bar{1}$, $Z = 2$, Nd/Sm: $a = 686.32(9)/680.92(9)$, $b = 763.06(8)/756.4(1)$, $c = 954.8(1)/951.2(1)$ pm, $\alpha = 96.83(1)^\circ/96.66(2)^\circ$, $\beta = 103.78(2)^\circ/103.67(2)^\circ$, $\gamma = 104.40(1)^\circ/104.35(2)^\circ$, $R1 = 0.0184/0.0282$ (all data)) have to be formulated as $\text{RE}_4(\text{As}_2\text{O}_5)_2(\text{As}_4\text{O}_8)$ emphasizing the presence of both $\text{As}_2\text{O}_5^{4-}$ and cyclic $\text{As}_4\text{O}_8^{4-}$ anions. The $\text{As}_4\text{O}_8^{4-}$ anions show C_i symmetry and connect layers of the composition $\{\infty[\text{RE}_2(\text{As}_2\text{O}_5)]_2\}^{4+}$ along the [001] direction. The lanthanide ions are in nine- and eightfold coordination, respectively.

Key words: Lanthanides, Arsenites, *cyclo*-Tetraarsenite Anion