

Aluminat-Pentelate(III) $A_2^I M_2 Al_2 O_7$ und $A^{II} M_2 Al_2 O_7$

($A^I = \text{Rb, Cs}$; $A^{II} = \text{Ba}$; $M = \text{As, Sb}$)

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The crystal structures of the title compounds, which were synthesized at temperatures between 500 and 850 °C *via* reaction of Al_2O_3 , M_2O_3 and M_2O_5 ($M = \text{As, Sb}$) with the respective elemental alkaline and alkaline earth elements, have been determined by single crystal X-ray diffraction. The two isotypic compounds $A_2^I Sb_2 Al_2 O_7$ ($K_2 Sb_2 Al_2 O_7$ structure type, $A^I = \text{Rb/Cs}$; trigonal, space group $P\bar{3}m1$, $a = 566.04(10)/570.23(8)$, $c = 836.8(2)/888.0(2)$ pm, $Z = 1$, $R1 = 0.0511/0.0461$) contain double layers consisting of vertex-sharing tetrahedra $[Al_2O_7]$, which are connected to ψ -tetrahedra SbO_3 *via* common vertices. These double layers are stacked in identical orientation (AA sequence), while in the barium compound $Ba Sb_2 Al_2 O_7$ (trigonal, space group $R32$, $a = 545.5(7)$, $c = 2377.3(12)$ pm, $Z = 3$, $R1 = 0.0427$) similar layers $[Sb_2 Al_2 O_7]$ are stacked in an ABC sequence. In the arsenic(III) aluminate $Cs_2 As_2 Al_2 O_7$ (orthorhombic, space group $Imm2$, $a = 546.9(3)$, $b = 1003.81(16)$, $c = 888.5(3)$ pm, $Z = 2$, $R1 = 0.0313$) the Al_2O_7 moieties are similarly connected *via* $[AsO_3]$ units, in this case not only forming layers, but a three-dimensional network. In the three antimonates, the A cations are not coordinated by the lone electron pairs of M(III), which are oriented towards the interior of the sheets, whereas in the arsenate the lone electron pairs play a significant role in the coordination of one of the two crystallographically independent Cs sites.

Key words: Antimonates, Arsenates, Aluminates, Lone-Pair Cations