# Preparation and Crystal Structure of $Cs_4Nb_2S_{11}$

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The new polychalcogenide $Cs_4Nb_2S_{11}$ was prepared from the melt. $Cs_4Nb_2S_{11}$ is orthorhombic, *oP68*, s.g. $Pca2_1$ (No.29), $Z = 4$ with $a = 13.775(9)$ Å, $b = 8.043(9)$ Å, $c = 18.306(5)$ Å. The crystal structure was determined from diffractometer data and refined to a conventional $R$ of 0.052 (1104 Fo's, 154 variables). It is characterized by asymmetric discrete binuclear moieties $[Nb_2S_{11}]^{4-}$ which are separated by the alkali cations. Each Nb atom is side-on coordinated by two $S_2^{2-}$ groups, one bridging and one terminal sulfide ligand. Nb-S bond lengths are 2.15(1) Å to 2.22(1) Å (terminal) and 2.44(1)Å to 2.51(1) Å (others). A further longer Nb-S bond (2.86(1)Å and 2.90(1)Å, resp.) expands the coordination of the two crystallographically independent transition metal atoms to distorted pentagonal bipyramidal configurations. The Nb-Nb-distance is 3.517(3) Å. The anionic groups are arranged in hexagonal close packed slabs running parallel to (001). The atomic arrangement corresponds to that of $K_4Ta_2S_{11}$.

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