

$\text{K}_5[\text{FeO}_4]$ und $\text{K}_{17}[\text{Fe}_5\text{O}_{16}]$: Zwei neue Kalium-Oxoferrate(III)

$\text{K}_5[\text{FeO}_4]$ and $\text{K}_{17}[\text{Fe}_5\text{O}_{16}]$: Two New Potassium Oxoferrates(III)

Gero Frisch und Caroline Röhr

Institut für Anorganische und Analytische Chemie, Universität Freiburg, Albertstraße 21,
D-79104 Freiburg

Sonderdruckanforderungen an Prof. Dr.-Ing. C. Röhr. E-mail: caroline@ruby.chemie.uni-freiburg.de

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The title compounds were synthesized from potassium rich mixtures of Fe_2O_3 , elemental potassium and the hyperoxide KO_2 by applying short reaction times, a maximum temperature of 875 K and subsequent quenching of the samples. The structures of the two new oxoferrates(III) have been determined by single crystal X-ray diffraction. The orthoferrate(III) $\text{K}_5[\text{FeO}_4]$ ($\text{Na}_5[\text{GaO}_4]$ structure type, space group *Pbca*, $a = 1124,0(2)$, $b = 667,95(9)$, $c = 2034,8(3)$ pm, $Z = 4$, $R1 = 0,0585$) exhibits isolated ortho-anions $[\text{FeO}_4]^{5-}$ with nearly ideal tetrahedral geometry and Fe-O distance in the narrow range of 189 to 192 pm. The penta-ferrate $\text{K}_{17}[\text{Fe}_5\text{O}_{16}]$ (space group *Cm*, $a = 671,71(5)$, $b = 3560,8(3)$, $c = 670,81(5)$ pm, $\beta = 119,687(5)^\circ$, $Z = 2$, $R1 = 0,0291$) crystallizes with a new structure type. Its building units are isolated novel penta-nuclear anions composed of five corner sharing $[\text{FeO}_4]$ tetrahedra. These linear chain pieces $[\text{Fe}_5\text{O}_{16}]$ are arranged in a hexagonal rod packing, with a stacking sequence according to $|\text{:AB:}|$ along the large monoclinic b axis. The structure is thus related to that of the tetra-ferrate $\text{K}_{14}[\text{Fe}_4\text{O}_{13}]$ with a comparable packing of tetra-nuclear ferrate(III) anions.

Key words: Ferrates, Oxoferrates, Potassium