New Oxoferrates of the Alkali Metals

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Regarding structural motifs, the oxoferrates of the alkali metals are closely related to the oxosilicates due to the rigid coordination of the oxometallate anions: the angles of Fe-O-Fe bonds connecting two FeO_4-tetrahedra correlate strongly with the size of the alkali metal ions. An even greater structural variety of the ferrates arises from three major differences between Fe and Si: By assuming different oxidation-states, iron ions build FeO_4-tetrahedra of different size and charge. FeO_4-units with HS-d^4- (Fe^{IV}) and HS-d^3-configuration (Fe^{V}) show significant deviations from tetrahedral geometry due to Jahn-Teller distortion. Some ferrates of the heavier alkali metals even contain edge sharing tetrahedra. Our studies [1-3] yielded several novel phases illustrating the structural characteristics of the oxoferrate chemistry.

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