

Crystallographic and Magnetic Properties of KFeO_2

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The crystallographic and magnetic properties of KFeO_2 powder prepared by ball-mill method, have been studied by X-ray diffraction (XRD), Mössbauer spectroscopy, and vibrating sample magnetometer (VSM) measurements. The crystal structure of KFeO_2 powder at room temperature is determined to be an orthorhombic structure of $Pbca$ with its lattice constants $a_0 = 5.594$, $b_0 = 11.247$, and $c_0 = 15.863$ Å by Reitveld refinement. The M - H curves show antiferromagnetic behavior at 34 K and room temperature. Mössbauer spectra of KFeO_2 were taken at various temperatures ranging from 4.2 to 600 K. And the Néel temperature (T_N) was determined to be 930 K. The magnetic hyperfine field and isomer shift value at 4.2 K were 519 kOe and 0.19 mm/s, respectively.

Index Terms—Alkali materials, ball-mill method, Mössbauer spectroscopy, potassium.