



Magnetic properties of double perovskite $\text{Ca}_2\text{FeMoO}_6$ by neutron diffraction and Mössbauer spectral studies

Sung Baek Kim¹ · Chul Sung Kim²

Received: 20 January 2021 / Accepted: 10 May 2021

© Akadémiai Kiadó, Budapest, Hungary 2021

Abstract

Crystallographic and magnetic properties of the double perovskite oxide $\text{Ca}_2\text{FeMoO}_6$ were studied. The single phase polycrystalline $\text{Ca}_2\text{FeMoO}_6$ powder was prepared by a solid-state reaction method. The crystal structure of the $\text{Ca}_2\text{FeMoO}_6$ is found to be monoclinic with lattice constants $a_0 = 5.4056 \text{ \AA}$, $b_0 = 5.5170 \text{ \AA}$, $c_0 = 7.6971 \text{ \AA}$, and $\beta = 89.92^\circ$. The Mössbauer spectra have been taken at various temperatures ranging from 17 to Curie temperature (T_C) was found to be 350 K. The isomer shift value at room temperature is 0.43 mm/s relative to the Fe metal that are consistent with the Fe^{3+} valence state. Hyperfine parameters of the Mössbauer spectra were analyzed as a function of temperature and observed the magnetic properties with crystallographic changes through neutron diffraction experiments.

Keywords Double perovskite · $\text{Ca}_2\text{FeMoO}_6$ · Mössbauer spectroscopy · Neutron diffraction · Tolerance factor · Curie temperature