New Physics: Sae Mulli,
Vol. 70, No. 3, March 2020, pp. 212∼219
http://dx.doi.org/10.3938/NPSM.70.212

Standard Iron Oxides and Mössbauer Spectroscopy

Hyunkyung Choi · Jae Yeon Seo · Jeonghun Kim · Chul Sung Kim*
Department of Physics, Kookmin University, Seoul 02707, Korea

Young Rang Uhm · Gwang Min Sun
Korea Atomic Energy Research Institute, Daejeon 34057, Korea

(Received 3 November 2019 : revised 8 November 2019 : accepted 11 November 2019)

In various industries, Mössbauer spectroscopy is used to conduct research to obtain information on the form of iron compounds and the state of Fe ions. Mössbauer spectroscopy is a high-resolution gamma-ray spectroscopy technique that provides information on the magnetic structure of a solid sublattice, the strength of bonding by interactions between adjacent atoms, and the ion state of iron through energy levels in the atomic nucleus. Above all, the calibration of a Mössbauer spectrometer is important in determining the reliability of the resulting data therefore, the standard value of the Mössbauer spectrum at room temperature according to the thickness of the α-Fe foil is discussed. In particular, the Mössbauer data for standard iron oxides are expected to play a major role in providing a standard for data analysis in every field and in securing domestic data beyond the dependence of data provided by international standards organizations. This review introduces the results of Mössbauer research on the representative iron oxides (Fe_2O_3 and Fe_3O_4) and suggests standard values for iron oxides to contribute to national standard development technology.

PACS numbers: 76.80.+y, 75.47.Lx
Keywords: Mössbauer spectroscopy, Iron Oxide