

Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Verwey transition of nano-sized magnetite crystals investigated by ^{57}Fe NMR SUMIN LIM, BAEK SOON CHOI, SOON CHIL LEE, department of physics, KAIST, JAEYOUNG HONG, JISOO LEE, TAEGHWAN HYEON, Center for Nanoparticle Research, Institute for Basic Science (IBS), Seoul 151-742, Korea, TAEHUN KIM, JAEHONG JEONG, JE-GEUN PARK, Center for Correlated Electron Systems, Institute for Basic Science — It is well known that magnetite crystals undergo a metal-insulator transition at the Verwey transition temperature, $T_V = 123$ K. In this work, we studied the Verwey transition of nano-sized crystals with ^{57}Fe NMR. In the metallic state above T_V , the NMR spectrum shows a single sharp peak, which broadens below T_V indicating the Verwey transition. We measured the spectra of the nano-crystals with radii of 16 nm, 25 nm, and 40 nm and compared with that of a bulk. The transition temperature obtained from the NMR spectra depends on both the crystal size and crystallinity. When the crystal size decreases from bulk to 16 nm, the transition temperature drops from 123 K to 100 K. The transition temperature of the samples kept dry air decrease due to aging.

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Date submitted: 29 Dec 2015

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