Abstract Submitted for the MAR09 Meeting of The American Physical Society

Electronic structure and spin-filter effect of  $\gamma$ -Fe<sub>2</sub>O<sub>3</sub> (maghemite) HIROYOSHI ITOH, Department of Pure and Applied Physics, Kansai University, Japan, SYUTA HONDA, JUN-ICHIRO INOUE, Department of Applied Physics, Nagoya University, Japan, HIDETO YANAGIHARA, EIJI KITA, Institute of Applied Physics, University of Tsukuba, Japan — We theoretically study the electronic structure and spin-dependent transport of spinel-like  $\gamma$ -Fe<sub>2</sub>O<sub>3</sub> (maghemite) which is one of candidates for spin-filter devices. By performing first principles calculations (GGA+U) for iron vacancy ordered Fe<sub>64</sub>O<sub>96</sub>, the spin-dependent band-gap of the maghemite in the ferrimagnetic insulating ground state is determined. It is also shown that excess of Fe and O atoms significantly affects on the band gap of the minority spin state. In the light of obtained electronic structure, the spin-filter effect and variable range hopping of the maghemite are discussed.

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Date submitted: 20 Nov 2008

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