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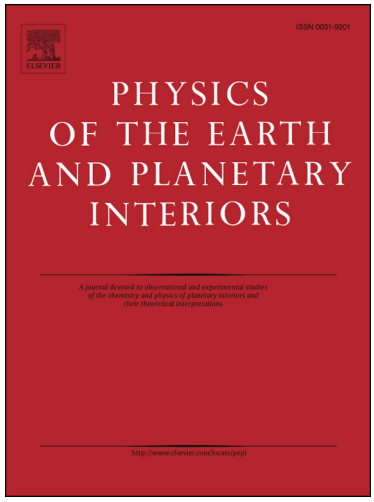

Hydrostatic pressure effect on magnetic hysteresis parameters of multidomain magnetite: Implication for crustal magnetization

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PII: S0031-9201(14)00146-0
DOI: http://dx.doi.org/10.1016/j.pepi.2014.06.001
Reference: PEPI 5749

To appear in: *Physics of the Earth and Planetary Interiors*

Received Date: 28 May 2013
Revised Date: 25 February 2014
Accepted Date: 2 June 2014

Please cite this article as: Sato, M., Yamamoto, Y., Nishioka, T., Kodama, K., Mochizuki, N., Tsunakawa, H., Hydrostatic pressure effect on magnetic hysteresis parameters of multidomain magnetite: Implication for crustal magnetization, *Physics of the Earth and Planetary Interiors* (2014), doi: http://dx.doi.org/10.1016/j.pepi.2014.06.001

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Hydrostatic pressure effect on magnetic hysteresis parameters of multidomain magnetite: Implication for crustal magnetization

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Abstract

Hydrostatic pressure effects on magnetic parameters for crustal rock have been poorly investigated yet, while it is important for an understanding of source of long-wavelength magnetic anomaly, which is considered to reside in deep crust. In this study we have conducted the *in-situ* magnetic hysteresis measurements on multidomain (MD) magnetite under high pressure up to 1 GPa. With special attention to hydrostatic condition and sample preparation, pressure dependences of its magnetic hysteresis parameters (saturation magnetization, M_s; saturation remanence, M_{rs}; coercivity, B_c; coercivity of remanence, B_{cr}) are revealed as follows: (1) B_c monotonically increases with pressure at a rate of +91 %/GPa; (2) M_s is constant under high pressure up to 1 GPa; and (3) M_{rs} increases with pressure up to 0.5 GPa by ~30 % and reaches to saturation above the pressure; (4) B_{cr} is nearly constant at low pressure, and it increases above ~0.6 GPa; and (5) the changes in ratios M_{rs}/M_s and B_{cr}/B_c correlate with each other, resulting in systematic movement on the Day plot. These findings allow us to estimate change in a relaxation time of magnetic remanence carried by MD magnetite as

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