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ME-μSR MgO study: search for O[-1] earthquake-like precursors
C. BOEKEMA, San Jose State University & SETI NASA Ames, G. WELCH, C.E. JOHNSON, San Jose State University, F.T. FREUND, NASA Ames & SETI — We analyze O^{-1} earthquake-like precursor effects [1,2] by studying the μSR signals of MgO using Muon-Spin Resonance and Maximum Entropy (ME) [3,4]. Due to its abundance in the earth crust, MgO is ideal for studying these features: O^{-1} (or positive hole) formation results from a break in an oxygen anion pair under elevated temperature or high pressure conditions [2]. For a 3N-MgO single crystal above RT, a small percentage (<1%) is predicted to be in an O^{-1} state, instead of typical O^{-2} ions. ME analysis of transverse field (100 Oe) MgO data show asymmetrical μSR peaks at $\sim$ 1.4 MHz. [4] Small T-dependent deviations from a Lorentzian (Lor) signal could be effects of O^{-1} states in MgO. We have fitted ME transforms with three Lorentzians to obtain a reasonable description of the 1.4-MHz peak. The T dependences of this 3-Lor set and their B-field dependences at 17°C are reported and discussed, and their relation to precursor earthquake-like O-valency effects. Research supported by RSCA-SJSU, SETI, WiSE-SJSU and AFC San Jose.

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[2] FT Freund *et al,* Phys Chem Earth **31** (2006) 389.
[3] C Boekema and MC Browne, MaxEnt 2008, AIP Conf Proc #1073 p260.
[4] S Lee *et al,* HUIC Educ, Math & Eng Tech Conf, Uo HI (2013).

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