Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

High-pressure Neutron Powder Diffraction and Inelastic Neutron Scattering Studies on the Mineral Jarosite $KFe_3(SO_4)_2(OH)_6$ MONIKA HARTL, ALICE ACATRINEI, LUKE DAEMEN, HONGWU XU, Los Alamos National Laboratory, KIM TAIT, Royal Ontario Museum, YUEJIAN WANG, SVEN VOGEL, JIANZHONG ZHANG, YUSHENG ZHAO, Los Alamos National Laboratory — The mineral jarosite $KFe_3(SO_4)_2(OH)_6$ has been detected in rocks at the Meridiani Planum region of Mars [1 and cited therein]. Jarosite is typically formed in aqueous environments at acidic pH. It decomposes to ferric oxohyroxides in humid climate. This gives rise to the question under which conditions jarosite was formed on Mars and what it can tell us about the climatic cycles and the former presence of water on Mars. We are looking at the phases of jarosite at elevated temperature and pressure and were able to show the stability of jarosite up to 6 GPa at room temperature and up to 3 GPa at 300 ^{o}C using neutron powder diffraction. Furthermore, we used inelastic incoherent neutron scattering to look at the vibrational modes of the hydroxyl groups in jarosite at various temperatures between 10K and 200K. [1] A. Banin, Science 309 (2005) 888

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Date submitted: 27 Nov 2007 Electronic form version 1.4