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Thermal expansion and pressure effect in the Kagome-staircase compound $Ni_3V_2O_8$[1] R. CHAUDHURY, F. YEN, C. R. DELA CRUZ, B. LORENZ, Y. Q. WANG, Y. Y. SUN, C. W. CHU[2], TCSUH and Dept. of Physics, University of Houston — $Ni_3V_2O_8$ has attracted attention because of the ferroelectricity (FE) induced by a helical magnetic order. Strong spin-lattice interaction is necessary to explain the ionic displacements leading to FE. To reveal the signature of lattice strain associated with the ferroelectric transitions we have conducted high-resolution thermal expansion measurements along the a, b, $c$axes. The strongest lattice anomalies are observed at the low-temperature (3.9 K) lock-in transition from the incommensurate helical magnetic modulation into a commensurate magnetic structure. The stability of the FE with respect to lattice strain as induced by hydrostatic pressure was investigated by measuring the dielectric constant and the ferroelectric polarization under pressures up to 2 GPa. The pressure-temperature phase diagram of $Ni_3V_2O_8$ is determined. The low-temperature commensurate phase in $Ni_3V_2O_8$ is stabilized under pressure and the ferroelectricity is completely suppressed above a critical pressure of 1.64 GPa.

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[2]also at: LBNL, Berkeley and HKUST, Hong Kong

Bernd Lorenz
TCSUH, University of Houston

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