Direct Evidence of Magnetoelastic Coupling in \(\text{Ni}_3\text{V}_2\text{O}_8\).\(^1\) LU-CIANA I. VERGARA, J. CAO, J. L. MUSFELDT, University of Tennessee, N. ROGADO, R. CAVA, Princeton University, F. YEN, R. P. CHAUDHURY, B. LORENZ, University of Houston — We investigate the infrared active phonons of the Kagome staircase compound \(\text{Ni}_3\text{V}_2\text{O}_8\) as a function of temperature to elucidate changes in magnetoelastic coupling through the cascade of low-temperature magnetic transitions. A detailed analysis of the \(a\)- and \(c\)- polarized vibrational mode trends demonstrates that: i) the approach to the cascade of magnetic transitions is driven by the high frequency stretching modes and the highest frequency bending mode along \(a\); ii) the paramagnetic to high-temperature incommensurate phase transition is driven by low frequency \(c\)-polarized modes; and iii) the high-temperature to low-temperature incommensurate phase transition is driven by all \(a\)-polarized modes plus the NiO\(_6\) stretching mode along \(c\). Work is in progress to elucidate the trends along \(b\). Overall, we find that the phonons are sensitive to the magnetic state, indicating that the lattice is flexible, coupling strongly to the spin system in this multiferroic material.

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