Temperature-dependent Raman studies of the magnetodielectric vanadates: Ni$_3$V$_2$O$_8$, Co$_3$V$_2$O$_8$, and K$_2$V$_3$O$_8$\(^1\) M. KIM, Y. GIM, S.L. COOPER, Department of Physics and Frederick Seitz Materials Research Laboratory, University of Illinois, Urbana, Illinois, 61801, USA, R.J. CAVA, Department of Chemistry, Princeton University, Princeton, New Jersey 08544 — The kagome staircase compounds, Ni$_3$V$_2$O$_8$ and Co$_3$V$_2$O$_8$, are known to exhibit dielectric anomalies at the magnetic transitions; and inhomogenously mixed-valent K$_2$V$_3$O$_8$ has been shown to have a strong dependence of the dielectric constant on applied magnetic field. However, while strong spin-lattice coupling is generally associated with the complex phases and phenomena in these materials, there has been little microscopic information about this coupling. In this talk, we present temperature-dependent Raman scattering studies of Ni$_3$V$_2$O$_8$, Co$_3$V$_2$O$_8$, and K$_2$V$_3$O$_8$ that allow us to investigate the microscopic connection between the strong spin-lattice coupling and the magnetodielectric effects in these materials.

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