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Raman study of KNi_2Se_2 and KNi_2S_2: an origin of re-entrant transition in KNi_2Se_2[1] NATALIA DRICHKO, Department of Physics and Astronomy, The Johns Hopkins University, JAMES NEILSON, Department of Chemistry, Colorado State University, TYREL MCQUEEN, Department of Chemistry, Department of Physics and Astronomy The Johns Hopkins University — The unusual phenomena of an increase in symmetry upon cooling due to a re-entrant transition can be associated with electronic correlations. In KNi_2Se_2 our vibrational Raman spectroscopy study identifies regular Ni-atoms displacements, which disappear below approximately 50 K resulting in an increase of symmetry of the unit cell. At low temperatures heavy fermion behavior with m_{eff} of about $20m_e$ is observed [1]. To find the origin of this untypical high-temperature behavior, we compare our results on KNi_2Se_2 with that of the sister-compound KNi_2S_2 [2], where Raman spectroscopy does not observe clear evidence of the high-temperature symmetry breaking, but the heavy fermion effect is still present.

[1] J. R. Neilson et al. Phys. Rev. B (2012), 86, 054512.
[2] J. R. Neilson et al. Phys. Rev. B (2013), 87, 045124

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