

## **Raman spectroscopy of CaIrO<sub>3</sub> postperovskite up to 30 GPa**

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### **ABSTRACT**

We have measured Raman spectra of the postperovskite (PPv) phase in CaIrO<sub>3</sub> up to 30 GPa to constrain the Grüneisen parameter ( $\gamma$ ). We identified a total of 4 strong modes between 200 and 650 cm<sup>-1</sup>, which is in contrast with the Raman spectra of Mn<sub>2</sub>O<sub>3</sub> and MgGeO<sub>3</sub>-PPv where at least nine different modes have been detected. We found no sign of a phase transition in the Raman spectra of PPv CaIrO<sub>3</sub>, which supports the stability of the PPv phase up to 30 GPa and room temperature in CaIrO<sub>3</sub>. The spectroscopic Grüneisen parameter,  $\gamma_{\text{sp},0} = 1.66\text{--}1.72$ , constrained from our Raman data, is in excellent agreement with the thermodynamic Grüneisen parameter,  $\gamma_{\text{th},0} = 1.75 \pm 0.05$ , calculated from recent XRD measurements (Martin et al. 2007) on CaIrO<sub>3</sub>-PPv synthesized at high pressure and temperature similar to our starting material. Our result suggests that  $\gamma_{\text{sp}}$  constrained by Raman measurements provides a reasonable estimate on the  $\gamma_{\text{th}}$  of the PPv phase in CaIrO<sub>3</sub>.

**Keywords:** Postperovskite, CaIrO<sub>3</sub>, Grüneisen parameter, Raman spectroscopy, thermal equation of state