

## **Raman spectroscopy of apatite irradiated with swift heavy ions with and without simultaneous exertion of high pressure**

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Durango apatite was irradiated with energetic U ions of 2.64 GeV and Kr ions of 2.1 GeV, with and without simultaneous exposure to a pressure of 10.5 GPa. Analysis by confocal Raman spectroscopy gives evidence of vibrational changes being marginal for fluences below  $5 \times 10^{11}$  ions/cm<sup>2</sup> but becoming dominant when increasing the fluence to  $8 \times 10^{12}$  ions/cm<sup>2</sup>.

Samples irradiated with U ions experience severe strain resulting in crystal cracking and finally breakage at high fluences. These radiation effects are directly linked to the formation of amorphous tracks and the fraction of amorphized material increasing with fluence. Raman spectroscopy of pressurized irradiated samples shows small shifts of the band positions with decreasing pressure but without a significant change of the Grüneisen parameter. Compared to irradiations at ambient conditions, the Raman spectra of apatite irradiated at 10.5 GPa exhibit fewer modifications, suggesting a higher radiation stability of the lattice by the pressure applied.