

## **Combined high pressure and heavy-ion irradiation: a novel approach**

Lang M, Zhang F, Lian J, Trautmann C, Neumann R, Ewing RC  
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Swift heavy-ion irradiations of a wide variety of materials have been used to modify and manipulate the properties of solids at the nanoscale. Recently, these high-energy irradiations have been successfully combined with high-pressure experiments. Based on results obtained for zircon ( $\text{ZrSiO}_4$ ), this paper introduces this new experimental approach involving diamond anvil cells and large ion-accelerator facilities. This technique provides a wide spectrum of geoscience applications from nanoscale simulations of fission-track formation under crustal conditions to phase transitions of radiation-damaged minerals resulting from meteorite impact.