

## Swelling of insulators induced by swift heavy ions

Trautmann C, Boccanfuso M, Benyagoub A, Klaumünzer S, Schwartz K, Toulemonde M  
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In many different insulators, the irradiation with heavy ions in the MeV to GeV energy regime induces pronounced volume expansion. This swelling increases with fluence, projected range and electronic stopping power of the ions. From the relative volume change per single ion as a function of the mean energy loss, a critical swelling threshold can be deduced. In amorphizable materials such as quartz and garnets (e.g.  $\text{Y}_3\text{Fe}_5\text{O}_{12}$  and  $\text{Gd}_3\text{Ga}_5\text{O}_{12}$ ), swelling is directly linked to the crystalline–amorphous phase change in each ion track, whereas for non-amorphizable ionic crystals (e.g. LiF and  $\text{CaF}_2$ ), the correlation to known defects is not yet clear.