D J Huntley, M R Baril and S Haidar Tunnelling in plagioclase feldspars. Journal of Physics D Applied Physics 40, 900-906, 2007

Abstract
Electrons trapped in a certain unidentified defect in feldspars can escape it by tunnelling to a nearby site. We show that, for plagioclase feldspars with up to 5% Ca cation (peristerites), the tunnelling rate is directly related to the Ca content. Any explanation must take into account the two-phase nature of such crystals, and three different models that can account for the correlation are discussed. We also show that the light emission that occurs in conjunction with tunnelling is from Mn2+ ions and that this tunnelling may be from a different defect. That plagioclases with low Ca contents have no detectable fading due to tunnelling leads to prospects for optical dating to a million years or more.