Speaker Prof. Jeffrey I. Zink

Title Squeezing Light out of Crystals: Triboluminescence

Abstract Triboluminescence is the emission of light caused by application of mechanical energy to solids. The term triboluminescence can cover a wide variety of forms of luminescence. The seminar will focus on the emission of light caused by fracture of molecular crystals. Five aspects of triboluminescence will be discussed. First, the spectroscopy will be described, and the excited state origins of the emitted light will be identified. The major origin is the lowest excited electronic state of the molecules comprising the crystal. Second, the mechanical aspects will be described and quantified. A phenomenological theory of the relationship between the temporal behavior of the luminescence and the emotion of cracks in the solid will be presented. Third, the internal pressures existent during triboluminescence will be discussed. Spectroscopic measurements show that the pressure at the site of the emission is low. Fourth, a general crystal structure requirement will be delineated. Triboluminescent crystals must belong to polar space groups. Finally, the excitation mechanism based on the above observations will be described.

Audience Level Chemists, Students,

Categories Inorganic Chemistry
Physical Chemistry