Analysis of differences in crystal movements from gas releasing crystals as dictated by lattice energy interactions

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Finding materials that are capable of converting external stimuli, such as light, into motions is of fundamental important to researchers interested applications pertaining to sensors, molecular machines, and biomimicking medical devices[1-4]. Much of the researching concerning crystalline devices has focused on polymorph switching or reaction strain generation in order to create macroscopic movement[5,6]. However, another mode of creating motions in crystals by gas release has only been reported once in the literature[7]. This poster will address crystals that create movement by photostimulated gas release. The crystalline movements of three similarly packed vinyl azides were characterized by video microscopy and analyzed in conjunction with nanoindentation, X-ray spectroscopy, and lattice energy calculations. Finally, the reaction mechanism was investigated by nanosecond laser flash photolysis and supported with DFT calculations.

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