Ion-induced craters on the surface of benzoyl glycine single-crystals studied by scanning force microscopy

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Crater-like defects on the surface of ion-irradiated organic single-crystals of benzoyl glycine (BG, hippuric acid) are imaged by scanning force microscopy (SFM). The crystals are irradiated by Xe, Pb, Bi and U with specific kinetic energy 11.4 MeV/u and fluences 5×10^{9} and 1×10^{10} ions/cm^{2}. In this energy range, the energy loss along the projectile trajectory is almost exclusively electronic. The areal density of the craters matches with the ion fluence confirming that each crater is the result of a single ion impact. The mean crater diameters range from 25 to 50 nm and exhibit a linear dependence on the ion energy loss. Assuming that the shape of the craters is a section of a sphere, mean crater volumes are calculated using the mean diameters and depths extracted from SFM images. These volumes are of order $1 - 5\times10^{3}$ nm^{3} and have a steep dependence on the energy loss. On average, 10^{4} molecules have been ejected from each crater.