Degradation of polyimide under irradiation with swift heavy ions

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Stacks of polyimide foils were irradiated with different swift heavy ions (Ti, Mo, Au) of 11.1 MeV/nucleon energy and fluences between 1 x 10^{10} and 2 x 10^{12} ions/cm^2. Beam-induced degradation of the imide group was analyzed by Fourier-transform infrared spectroscopy studying the absorption band at 725 cm^{-1} as a function of dose. In the UV-Vis spectral range, the absorption edge is shifted to larger wavelengths indicating carbonization. Such modifications are linked to the deposition of a critical dose of 2.7 MGy (Ti) and I MGy (Mo, Au). In addition, irradiation-induced changes of the electrical conductivity were studied by means of dielectric spectroscopy.