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Ion and neutral particle emission from polytetrafluoroethylene under 157-nm irradiation STEPHEN LANGFORD, SHARON JOHN, THOMAS DICKINSON, Washington State University — Polytetrafluoroethylene (PTFE) is an important electronic material. Interactions with 157-nm laser radiation are of interest in the deposition and patterning of thin films of PTFE and similar materials. We have characterized the desorption of neutral and charged species from PTFE surfaces during 157-nm irradiation by time-resolved quadrupole mass spectroscopy. The principal neutral species are $(\text{CF}_2)_x$ units. The neutral time-of-flight signals have a fast component with kinetic energies on the order of an eV, consistent with direct photochemical emission. These energetic neutrals are presumably created by scission of the C-C backbone by UV excitation. Slower neutral emissions are consistent with thermal emission from the surface at temperatures of several hundred kelvin above ambient. Much of the slower emission is attributed to thermally activated unzipping of the polymer backbone after photoelectronic scission. The principal positive and negative ions are C^+ and F^- . A large number of positive and negative charges are electrostatically coupled and travel together until separated by the electric fields of the mass filter.

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