Abstract Submitted
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Detection of fast neutral species by dissociative electron attachment[1] NICHOLAS BRAITHWAITE, ADE AYILARAN, The Open University — Bombardment by energetic neutrals derived from sheath-accelerated ions has been proposed as a means of stimulating anisotropic etching without the charge-induced side-effects associated with using the ions directly. The energetic neutrals are presumed to inherit the energy distribution of the parent ion flux. Using a mass-resolved mass spectrometer we detected fast neutral argon atoms and oxygen molecules formed by resonant charge exchange processes in an extraction volume separated by a fine mesh from a low pressure ICP in Ar-O2 mixtures. Within the spectrometer the fast neutrals are re-ionized by electron impact, before being passed into the energy and mass analyser sections of a Hiden EQP. A combination of signals with/without the reionizing electrons is used to differntiate fast neutrals from the residual parent ion beam. Neutral distributions are found to carry the same structural features as the parent fast ions. Moreover, the effective neutralisation of oxygen molecular ions was also revealed by reionizing the neutral molecular beam component by dissociative electron attachment: the negative atomic ions were observed at exactly half the energy of the parent molecular ion distribution, the remaining energy being in the recoil neutral DEA fragments.

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