

Abstract Submitted  
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**Mass and energy spectroscopy of fluorocarbon plasmas.** J.A. REES, Hiden Analytical — It is helpful for many processing plasmas which are operated using fluorocarbon and similar gases to have available information on the nature of the ions generated in the plasma and on the energies with which they impact on surfaces exposed to the plasma. To illustrate the range of data which may be obtained using a Hiden mass/energy spectrometer attached to a plasma reactor, measurements for RF plasmas in  $\text{CF}_4$ ,  $\text{CF}_3\text{I}$ ,  $\text{CCl}_2\text{F}_2$ , and  $\text{CHClF}_2$  in a parallel-plate reactor are outlined. Of particular interest, are the data obtained for the production of negative ions. For the experiments carried out with a 10 Watt plasma in  $\text{CHClF}_2$ , the dominant negative ions were  $\text{H}^-$ ,  $\text{Cl}^-$  and  $\text{F}^-$ . For each of these species, the relative rates of production from the parent gas and the mixture of neutral fragments produced by dissociation in the plasma were determined for electron energies of between 0.5 and 30eV. In the presence of a plasma, the contributions to the negative ion population of electron attachment to the dissociation fragments are also clearly seen. In the absence of a plasma, the electron attachment rates measured for the production of  $\text{CF}_3^-$  ions from the parent  $\text{CF}_4$ , show clearly the contributions of two formation pathways via the ground and excited states of the temporary  $\text{CF}_4^-$  ions first formed in the electron/molecule collisions. The ability of the mass/energy analyser to observe the energies of the attachment products is helpful.

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