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Time-resolved measurements of energy distributions for mass-identified ions in low pressure plasmas DAVE SEYMOUR, ALAN REES, TOM RUSSELL, CLAIRE GREENWOOD, Hiden Analytical, HIDEN TEAM — The direct measurement of energy distributions for mass-identified positive and negative ions arriving at target surfaces in plasma reactors has produced much useful information. The measurements have been, in the great majority of cases, of the time-averaged distributions even when the applied power to the plasma has been pulsed. Time-resolved data particularly during initiation and decay of pulsed plasmas would be advantageous. To facilitate such studies we have incorporated a Multi-Channel Scaler device into the ion detector system of a Hiden EQP instrument. Preliminary data which illustrate the capabilities of the new equipment will be presented. The data were obtained for a number of typical reactor systems. For the first of these the plasma was RF powered, typically at 20 Watts, in nitrous oxide at a pressure of 20 mTorr. The energy distributions for N2O+, NO+ and O+ and O- ions were measured throughout the duration of a pulsing cycle with particular emphasis on the ignition and decay of the plasma. The distributions show considerable detail and clear differences between the behaviour of the different ions which reflect differences in their production and decay mechanisms.

Dave Seymour
Hiden Analytical

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