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Time resolved energy distribution of ions from a cathode sheath in a plasma doping system in BF_3 LUDOVIC GODET, SVETLANA RADOVANOV, V, ZIWEI FANG, JAMES BUFF, Varian Semiconductor Equipment Associates, GILLES CARTRY, CHRISTOPHE CARDINAUD, Nantes University, France, VARIAN SEMICONDUCTOR EQUIPMENT ASSOCIATES TEAM, NANTES UNIVERSITY, FRANCE COLLABORATION — The time resolved energy distribution of ions present in a BF_3 glow discharge was sampled from the cathode sheath in a plasma doping system (PLAD). Plasma is generated by applying negative voltage pulses to a wafer in the presence of low pressure gas. An energy analyzer was placed behind the biased wafer and configured to measure the energy of ions striking the wafer during the pulse-on and pulse-off periods. The electrostatic optics and axial potential distribution in the energy analyzer were optimized to provide the best ion transmission efficiency. For very low energy implantation, a hollow cathode is used to create and maintain the plasma. The hollow cathode modifies the electric field in such a manner that the effective anode to cathode gap is reduced which in turn increases the plasma density and reduces the sheath thickness. The effects of the hollow cathode and the anode gap on the ion energy distribution are presented. The electron energy distribution function, measured with a Langmuir probe, and plasma sheath parameters are discussed.

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