Abstract Submitted for the DPP16 Meeting of The American Physical Society

Electronegative Plasma Instabilities in Industrial Pulsed Plasmas¹ PATRICK PRIBYL, ANDERS HANSEN, WALTER GEKELMAN, University fo California, Los Angeles — Electronegative gases that are important for industrial etch processes have a series of instabilities that occur at process relevant conditions. These have been studied since the 1990s, but are becoming a much more important today as plasma reactors are being pushed to produce ever finer features, and tight control of the etch process is becoming crucial. The experiments are being done in a plasma etch tool that closely simulates a working industrial device. ICP coils in different configurations are driven by a pulsed RF generators operating at 2-5 MHz. A computer controlled automated probe drive can access a volume above the substrate. The probe can be a Langmuir probe, a "Bdot" probe, or an emissive probe the latter used for more accurate determination of plasma potential. A microwave interferometer is available to measure line-averaged electron density. The negative ion instability is triggered depending upon the gas mix (Ar, SF_6) , pressure and RF power. The instability can be "burned through" by rapidly pulsing the RF power. In this study we present measurements of plasma current and density distribution over the wafer before, after and during the rapid onset of the instability.

¹work suported by NSF-GOALI award and done at the BAPSF

Walter Gekelman University of California, Los Angeles

Date submitted: 11 Jul 2016

Electronic form version 1.4