

# Silicon nitride layer deposition using cascaded arc plasmas

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\* 4:40 pm TF-WeA9 Silicon Nitride Layer Deposition Using Cascaded Arc Plasmas, R. M. J. Paffen, M. C. M. Van de Sanden, and D. C. Schram, Dept. of Physics, Eindhoven University of Technology, Eindhoven, The Netherlands.

An expanding thermal cascaded arc plasma is used to deposit a:SiN<sub>x</sub> layers for passivation applications. The deposited layers are characterized by refractive index and optical bandgap. For this characterization two diagnostic methods used: 1. in-situ ellipsometry in a compensating rotator setup to determine refractive index  $n$  and absorption  $k$  at HeNe wavelength 632.8 nm and deposition rate  $V_d$ . 2. Optical transmission and reflection measurements to determine the optical bandgap  $E_{gap}$  according to Taucs method, and refractive index and absorption in the visible region. Standard conditions under study are: an arc current of 50 A, a background pressure of 0.13 mbar, a flow mixture of Ar:N<sub>2</sub>:SiH<sub>4</sub> = 50:10:6 scc/s and a substrate temperature of 250°C. In a measurement series of 5 samples the substrate temperature is varied between 200 and 350°C and the nitrogen flow is changed from 2 up to 20 scc/s while other conditions were held standard. Results show that  $n$  and  $E_{gap}$  lie in the same range as layers made by conventional deposition techniques. The deposition rate however is much larger compared to conventional techniques.