Precise and narrow ion-energy distributions in plasma-enhanced ALD of nitrides using tailored-waveform biasing

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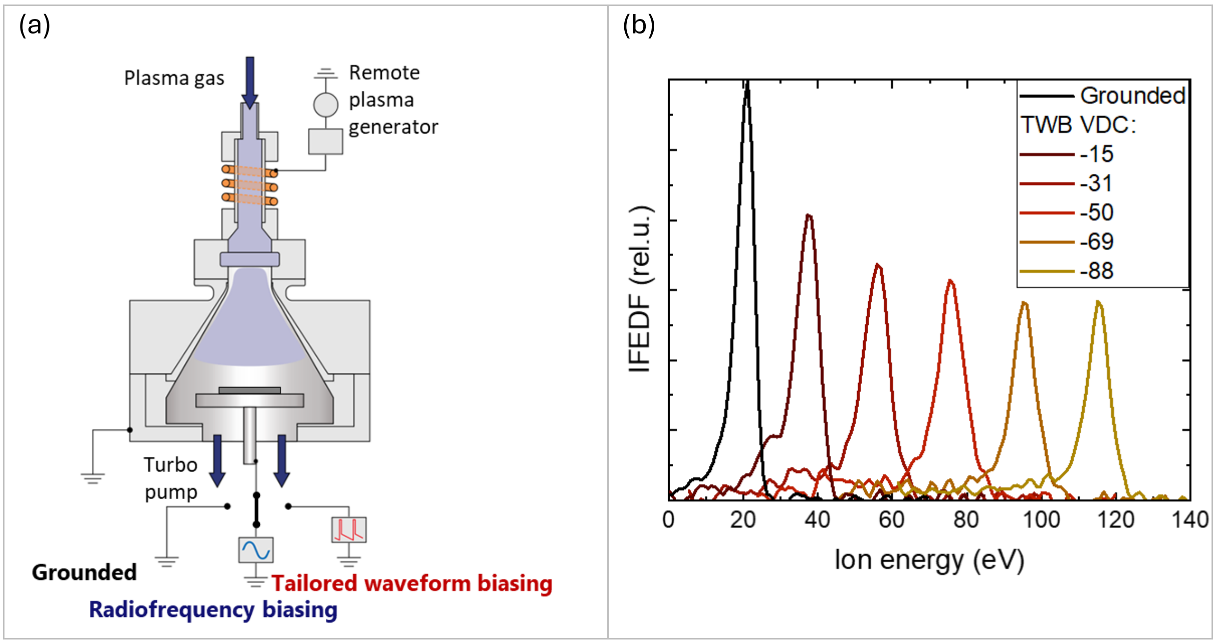

Figure 1: (a) Oxford Instruments FlexAL reactor with various options for ion energy control at the wafer level. In this work a prototype low-frequency tailored waveform (TW) generator from Prodrive Technologies B.V. was retrofitted to the wafer table. (b) Ion flux energy distribution functions (IFEDFs) for a N_2-H_2 plasma for a grounded wafer and applying various TW biasing voltages.

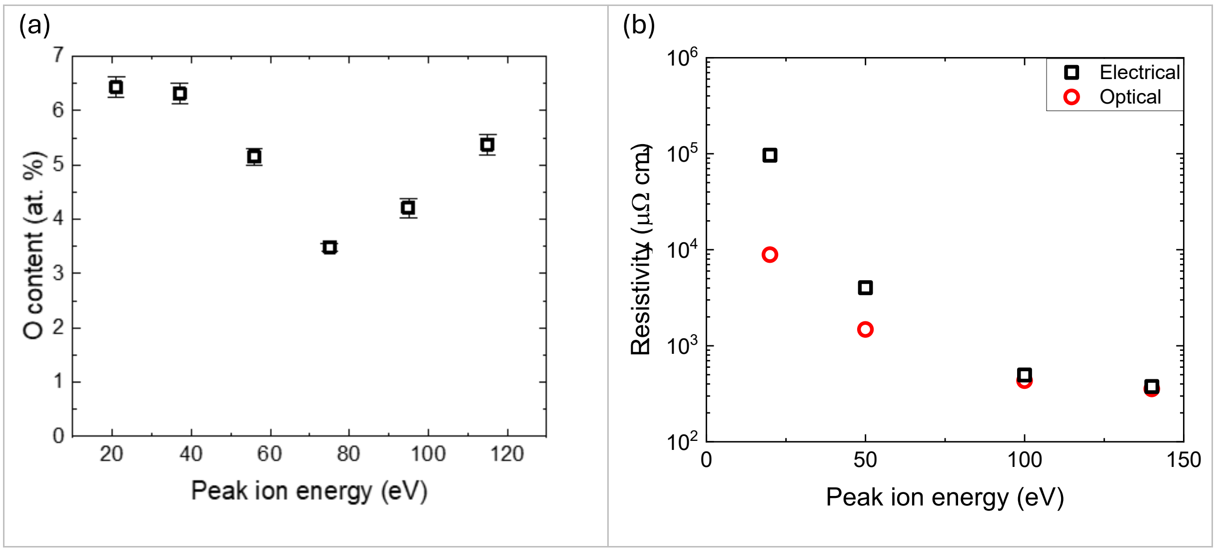

Figure 2: (a) O content in AlN_x films prepared by ALD using $AlMe_3$ and a H_2-N_2 plasma with TW biasing. (b) Electrical and optical resistivity of TaC_xN_{1-x} films prepared by ALD using $Ta[NMe_2]_3(N^tBu)$ and Ar-H_2 plasma with TW biasing.