

**Supplementary material**

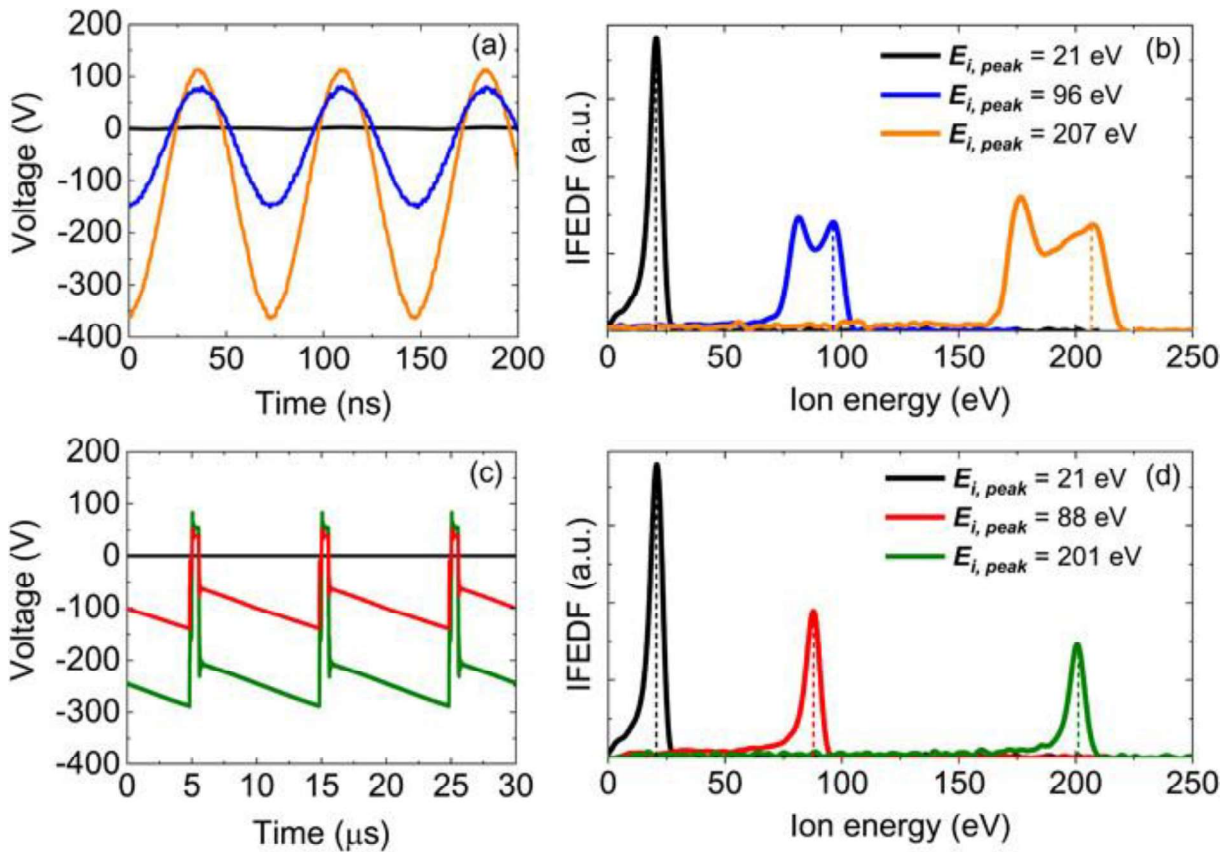


Figure 1. (a) and (c) Substrate voltage as a function of time and (b) and (d) ion flux-energy distribution functions (IFEDFs) for grounded and biased SiO<sub>2</sub> substrates in an Ar plasma generated using 200 W remote plasma source power and 3 mTorr pressure. The legends provide values for the ion energy at the peak of the IFEDFs,  $E_{i, peak}$ , which are indicated by dashed lines. Substrate biasing was performed using (a) and (b) radio-frequency (13.56 MHz) sinusoidal voltage waveforms with varying amplitudes and (c) and (d) low-frequency (100 kHz) tailored voltage waveforms with varying voltage pulse amplitudes at a constant voltage ramp.

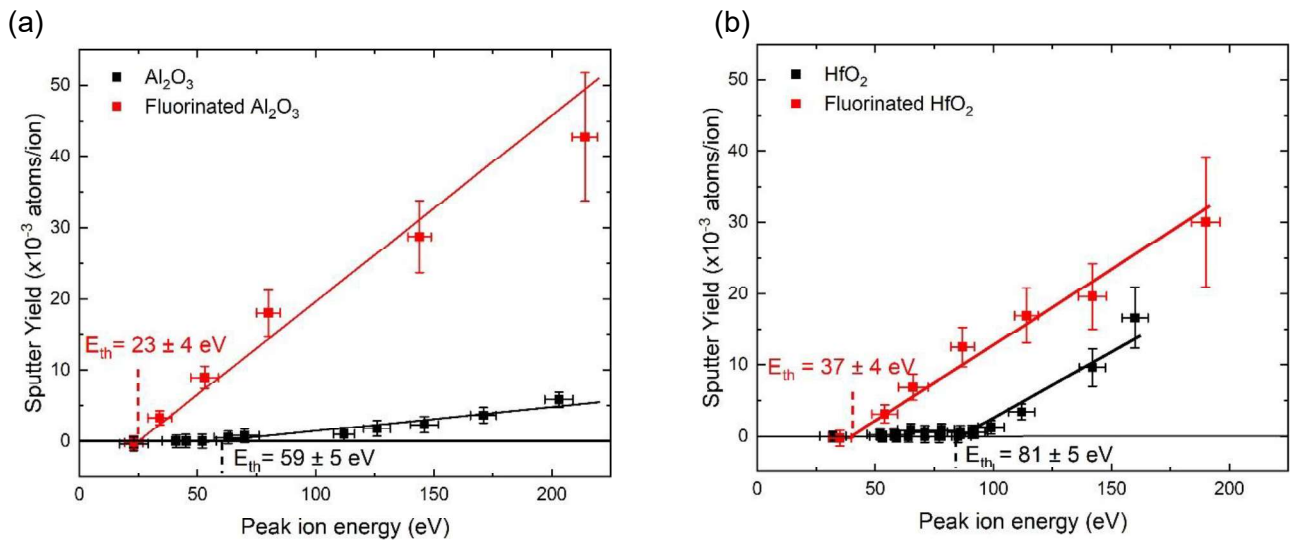


Figure 2: Sputter yields determined experimentally for pristine and fluorinated films of (a) Al<sub>2</sub>O<sub>3</sub> and (b) HfO<sub>2</sub>. Both materials show a significant reduction in sputter threshold and an increase in sputter yield after fluorination.