Plasma Enhanced Atomic Layer Etching of Zirconium Oxide using Plasma Fluorination and Ligand Exchange with $TiCl_4$

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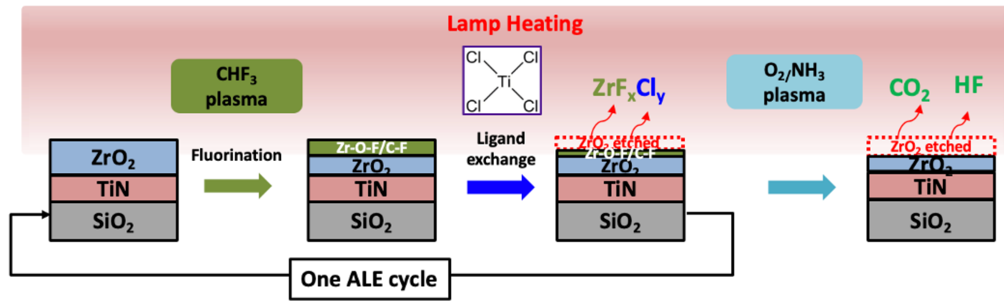

Figure 1. Sequence of the ALE process for ZrO_2 with surface fluorination and ligand-exchange.

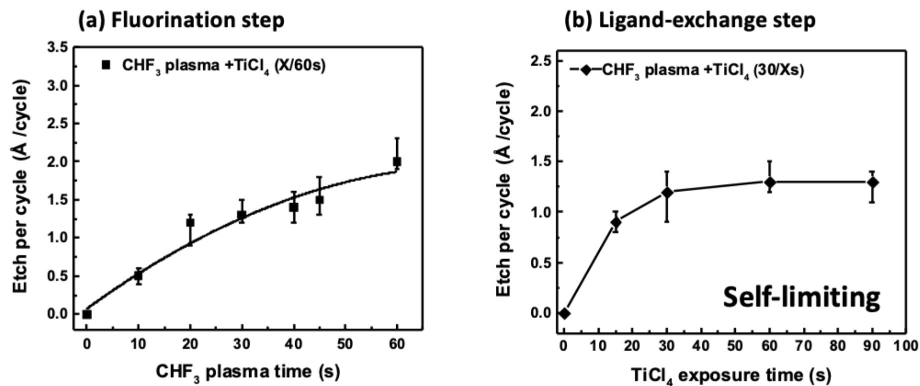

Figure 2. EPC of ZrO_2 at 300℃ as a function of (a) CHF_3 plasma time and (b) $TiCl_4$ exposure time.

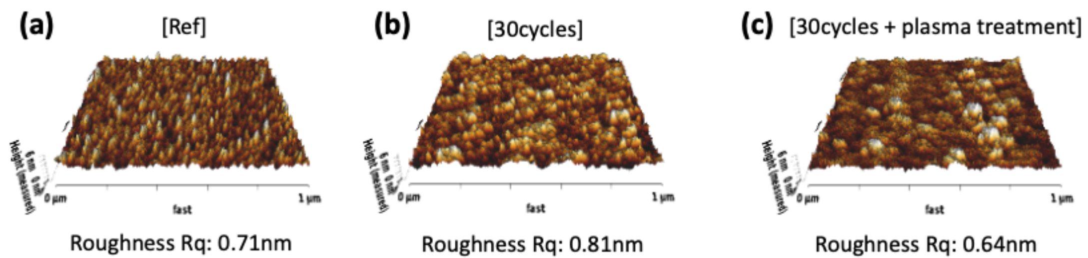

Figure 3. RMS roughness of ZrO_2 films (a) before and (b) after ALE 30cycles and (c) post plasma treatment.