Transient Assisted Processing (TAP): a novel scalable plasma processing approach for precision etching and sustainability in semiconductor manufacturing

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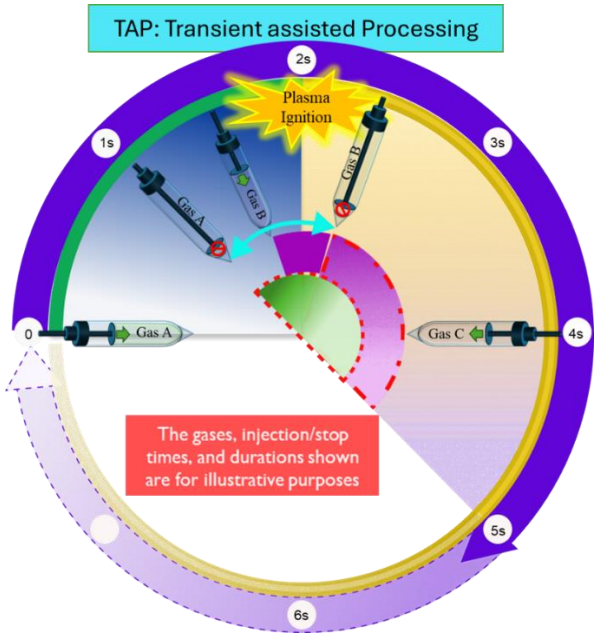

Fig 1. Schematic diagram of TAP process for plasma etching

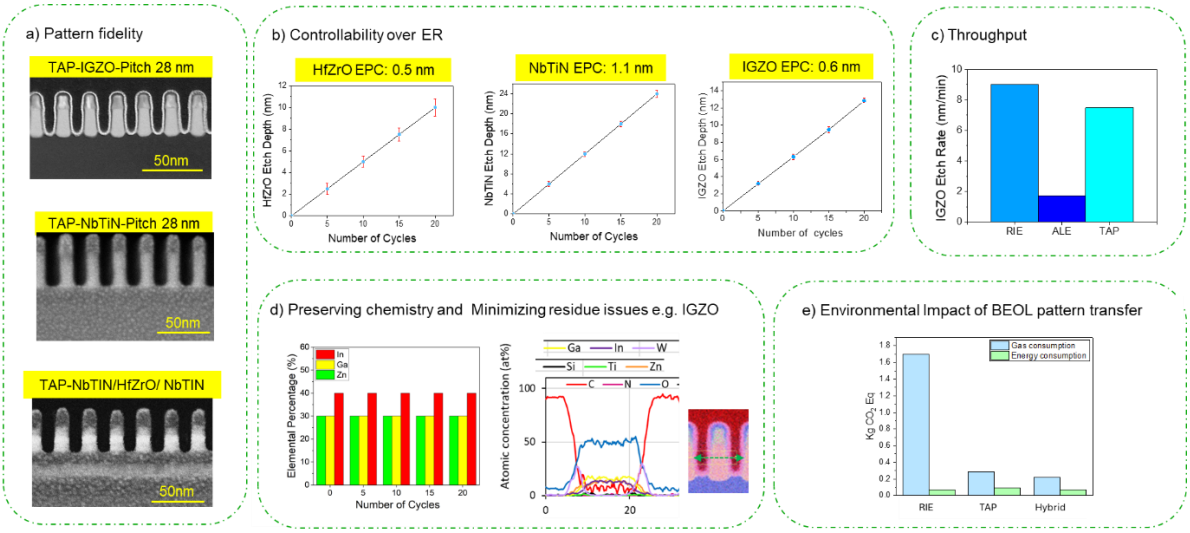

Fig 2. a) TEM and SEM image of IGZO, NbTiN, and NbTiN/HfZrO/NbTiN stack at pitch 28 nm, b) evolution of etched depth as a function of cycles, c) Etch rate comparison between conventional etching, ALE, and TAP, d) XPS analysis for surface composition as a function of number of cycles, and EDX analysis of the composition across the pattern after complete etching, and e) Environmental Impact to etch BEOL stack (MOR, SOG, aC, SiO_2, and TiN) using TAP, RIE and combination of both (Hybrid).

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