Atomic Layer Deposition of Aluminum, Hafnium and Zirconium Oxyfluoride Films with Tunable Stoichiometry

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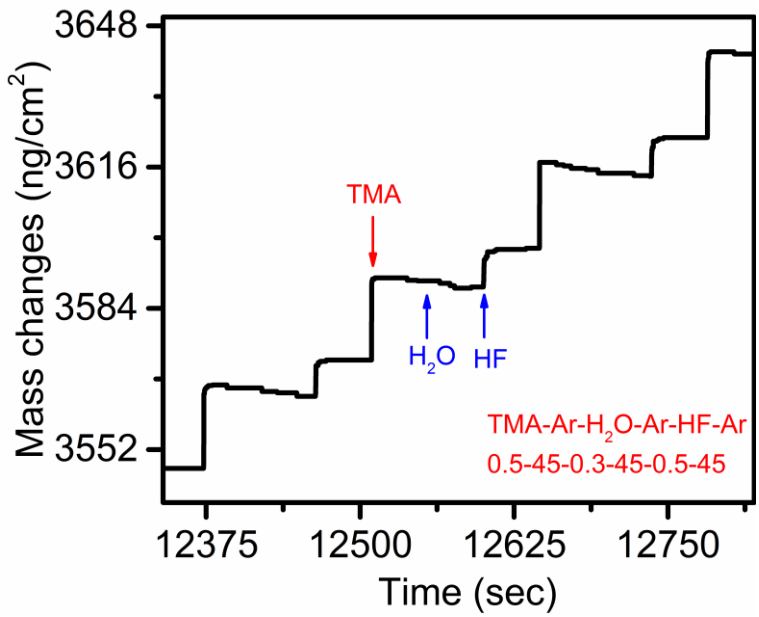

Figure 1: Mass changes recorded by in situ QCM during AlO_xF_y growth by the halide-exchange method at 150°C. The sequential exposure of TMA, H_2O and HF yielded an average mass gain per supercycle of 24-25 ng/cm^2.

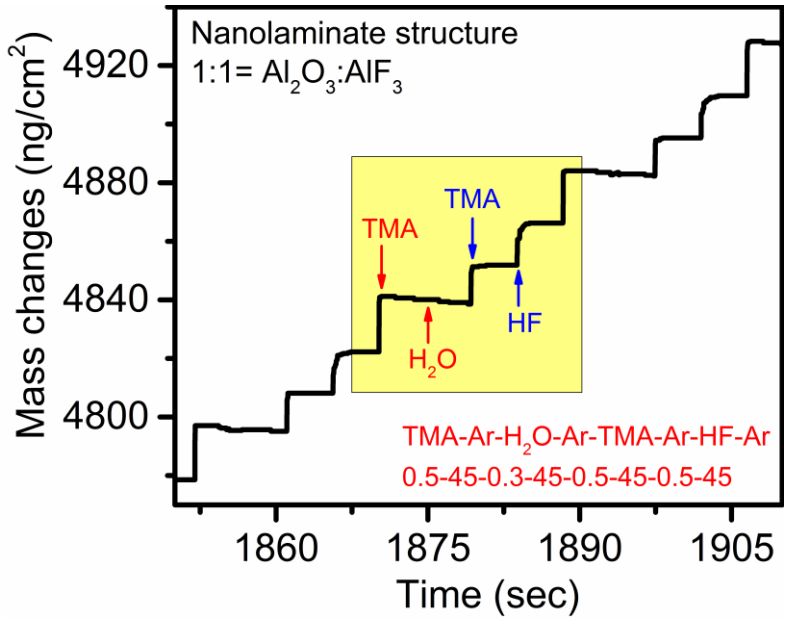

Figure 2: Mass changes recorded by in situ QCM during AlO_xF_y growth by the nano-laminate method at 150°C. The sequential exposure of TMA, H_2O and TMA, HF yielded an average mass gain per supercycle of 60-61 ng/cm^2.