

Figure 1. HfO₂ mass loading of 3 super-cycles of 20xALD/20xALE at 275°C measured using *in-situ* QCM coated with Co (blue) and Al₂O₃ (black). Mass loading on Co is offset by +1000 ng/cm². The data on the right is an expanded view of 20 ALE cycles during the first super-cycle to emphasize the etching rate difference.

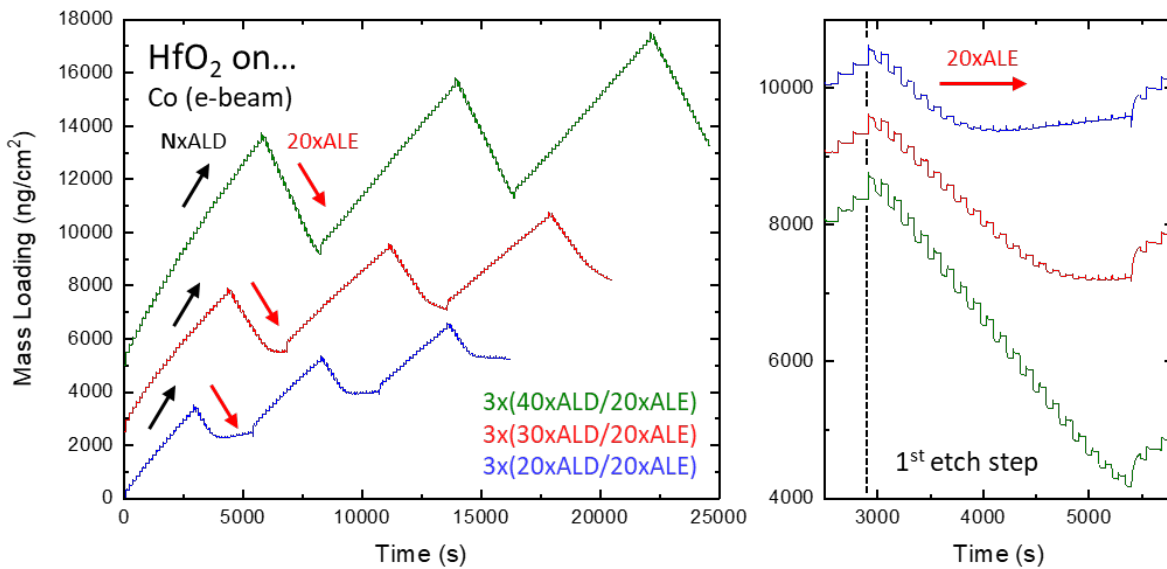


Figure 2. HfO₂ mass loading of 3 super-cycles of NxALD/20xALE at 275°C with N = 20 (blue), 30 (red), and 40 (green) measured using *in-situ* QCM coated with Co. Mass loading for N = 30 and N = 40 is offset by +2500 ng/cm² and +5000 ng/cm², respectively. The data on the right is an expanded view of 20 ALE cycles during the first super-cycle shifted horizontally and vertically to emphasize the etching rate difference.