

Figure 1. Pt seed layer thickness vs. time determined from in-situ ellipsometry data, for 3 deposition runs using 70 (blue), 35 (red), and 20 (green) ALD cycles. Note the excellent reproducibility in the ALD process and in-situ thickness results.

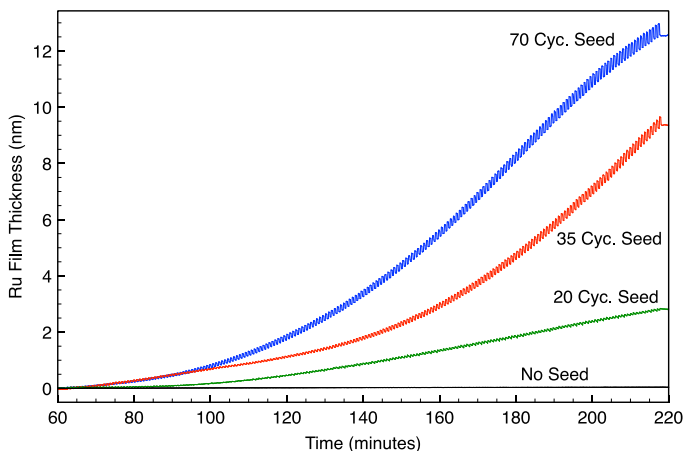


Figure 2. Ru film thickness vs. time determined from in situ ellipsometry data, for deposition runs using different numbers of ALD cycles for the Pt seed layer: 70 (blue), 35 (red), 20 (green), and 0 (black). Without the Pt seed layer, essentially no Ru growth was observed.

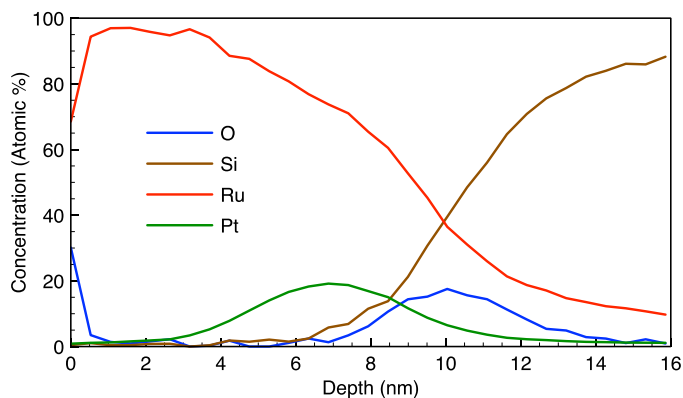


Figure 3. XPS depth profile, confirming the presence of a Ru film with no oxygen, and the Pt seed layer.

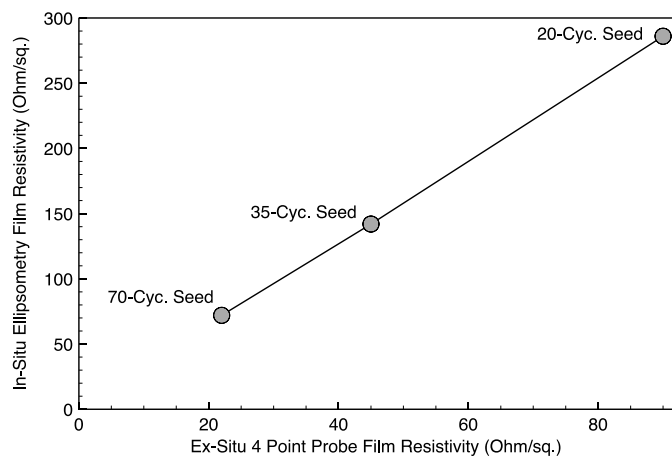


Figure 4. Correlation in Ru film resistivity between ex-situ 4 point probe (electrical) and in-situ ellipsometry (optical).

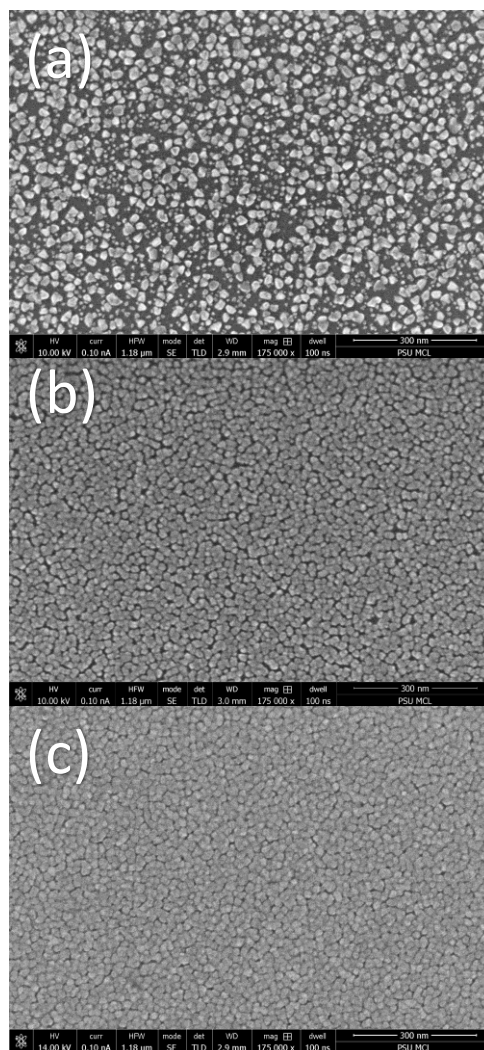


Figure 5. SEM images of Ru films with Pt seed layers of 20 (a), 35 (b), and 70 (c) ALD cycles, confirming an island nucleation growth mode.