

Figure 1 Largest Ru particle radius as a function of pattern width for 50 and 100 cycles Ru ALD. The yellow lines represent the thickness of an equivalent Ru film on TiN, a typical growth surface. The critical diameter is marked by a dashed line. The window for defect etching is illustrated for 20 and 100 nm wide patterns after 50 cycles. The continuous blue and black lines serve as guides to the eye.

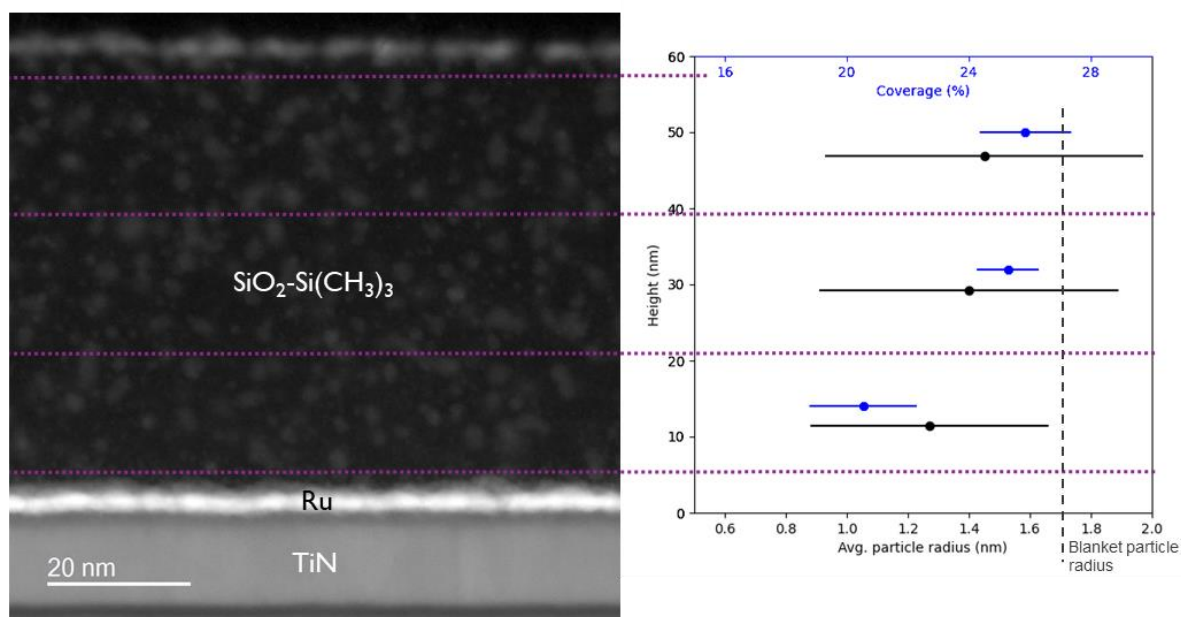


Figure 2 Left: scanning-tunneling electron microscope (STEM) image of a SiO<sub>2</sub> sidewall in a line-space pattern with critical dimension of 45 nm after dimethylamino-trimethylsilyl passivation treatment and 42 cy of Ru ALD. About 2.2 nm of closed Ru film is deposited onto the TiN growth surface. Right: Average and stand deviation of Ru particle radius and coverage for 3 distinct bands on the sidewall. The average particle size for all bands is smaller than on similarly processed blanket substrates. Both particle size and coverage decrease closer to the interface with the growth surface, which marks the depletion predicted theoretically.