Vos *et al.*, Area-Selective Deposition and Smoothing of Ru by Combining ALD and Selective Etching: Supplementary figures

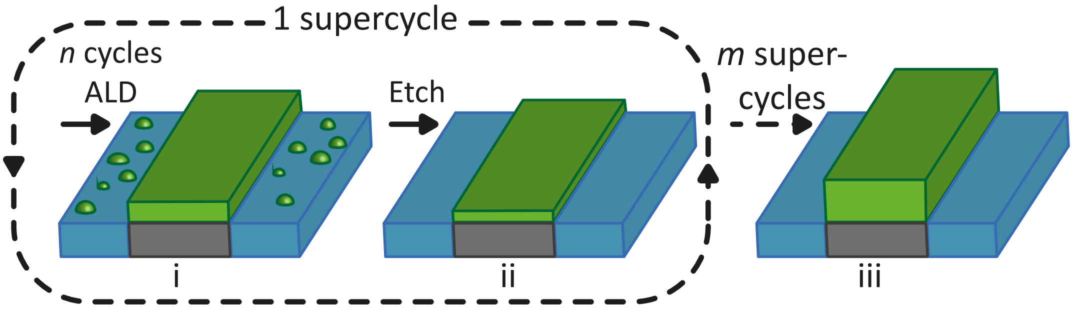

Figure 1. Schematic illustration of the concept of combining ALD with periodic etching to achieve area-selective deposition with a high selectivity. (i) ALD leads to film growth on the growth area (gray, e.g. Pt, Ru), and island formation on the non-growth area (blue, e.g. SiO_2). (ii) Inclusion of etch steps in a supercycle recipe results in removal of the unwanted deposition on the non-growth area. (iii) By performing *m* supercycles, a film with the desired thickness is obtained selectively on the growth area.

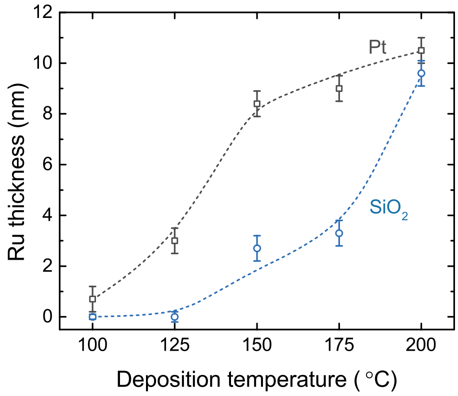

Figure 2. Ru film thickness on Pt (grey) and SiO_2 (blue) as a function of deposition temperature after performing 400 ALD cycles. The difference in Ru thickness between the Pt and SiO_2 is maximum at 150 °C.

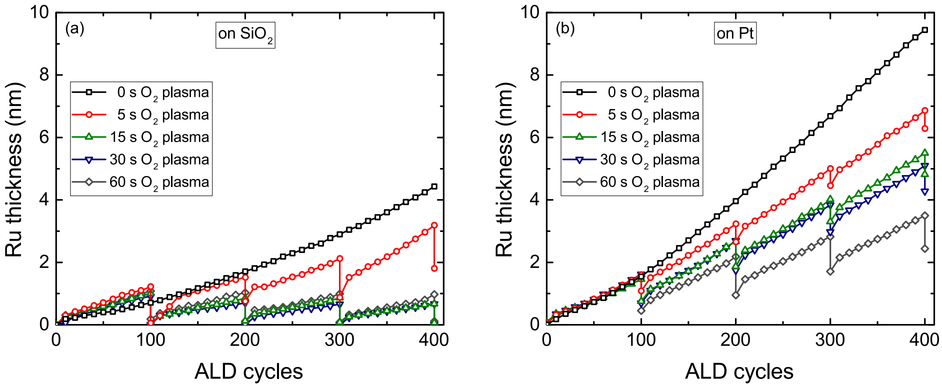

Figure 3. Ru film thickness on (a) SiO_2 and (b) Pt as a function of ALD cycles for different O_2 plasma etching times. An etch time between 5 and 15 s is sufficient to achieve a clean SiO_2 surface, while 5-6 nm Ru is deposited on Pt.

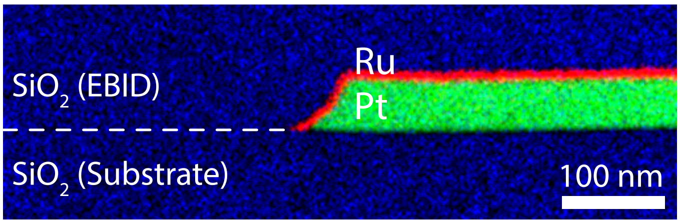

Figure 4. EDX elemental mapping of a SiO_2/Pt pattern, selectively coated with ~8 nm Ru. No Ru is detected on top of the SiO_2 substrate, demonstrating the excellent selectivity obtained with the ALD-etch supercycle.