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Supporting information for article:

High-temperature X-ray scattering studies of atomic layer deposited IrO_2

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The following pages contain the extra figures that were referenced in the main paper. The figure captions contain detailed explanations of each figure.



Figure S1 X-ray reflectivity measurements in (a) oxygen and (b) nitrogen as a function of measurement temperature (open circles). Red lines correspond to the best fit. Fitting with a reasonable model was impossible for the data measured in nitrogen at above 350°C.



Figure S2 (left) Relative changes of the density and unit-cell volume as a function of annealing temperature, (right) individual scattering length densities and thicknesses for the two-layer structure as a function of annealing temperature in an O_2 atmosphere. From the left-hand side figure one can see how relative changes of density and unit-cell volume are similar. The right-hand side figure shows how the thin layer at the interface changes thickness and density during annealing and how the main IrO_2 layer stays more constant.



Figure S3 The effect of the heating rate was tested by heating the IrO_2 film in a nitrogen atmosphere at different rates. A 2° 2 θ window was measured while constantly heating the sample. One measurement took one minute, and the heating rate was (a) 20°C/min or (b) 1°C/min. The results show that with the higher heating rate the phase transformation may occur at 25°C higher temperature than with slower heating. However, as the temperature increased 20°C during each fast scan, there is also a rather large error in the temperature with the higher heating rate.