

Figure S1:

Raw data for the TPR of 3.5% wt. % $\text{IrO}_2/\text{TiO}_2$ (anatase, $\text{BET} = 55 \text{ m}^2/\text{g}$) at different temperature ramping $\beta = 10\text{-}40 \text{ }^\circ\text{C}/\text{min}$.

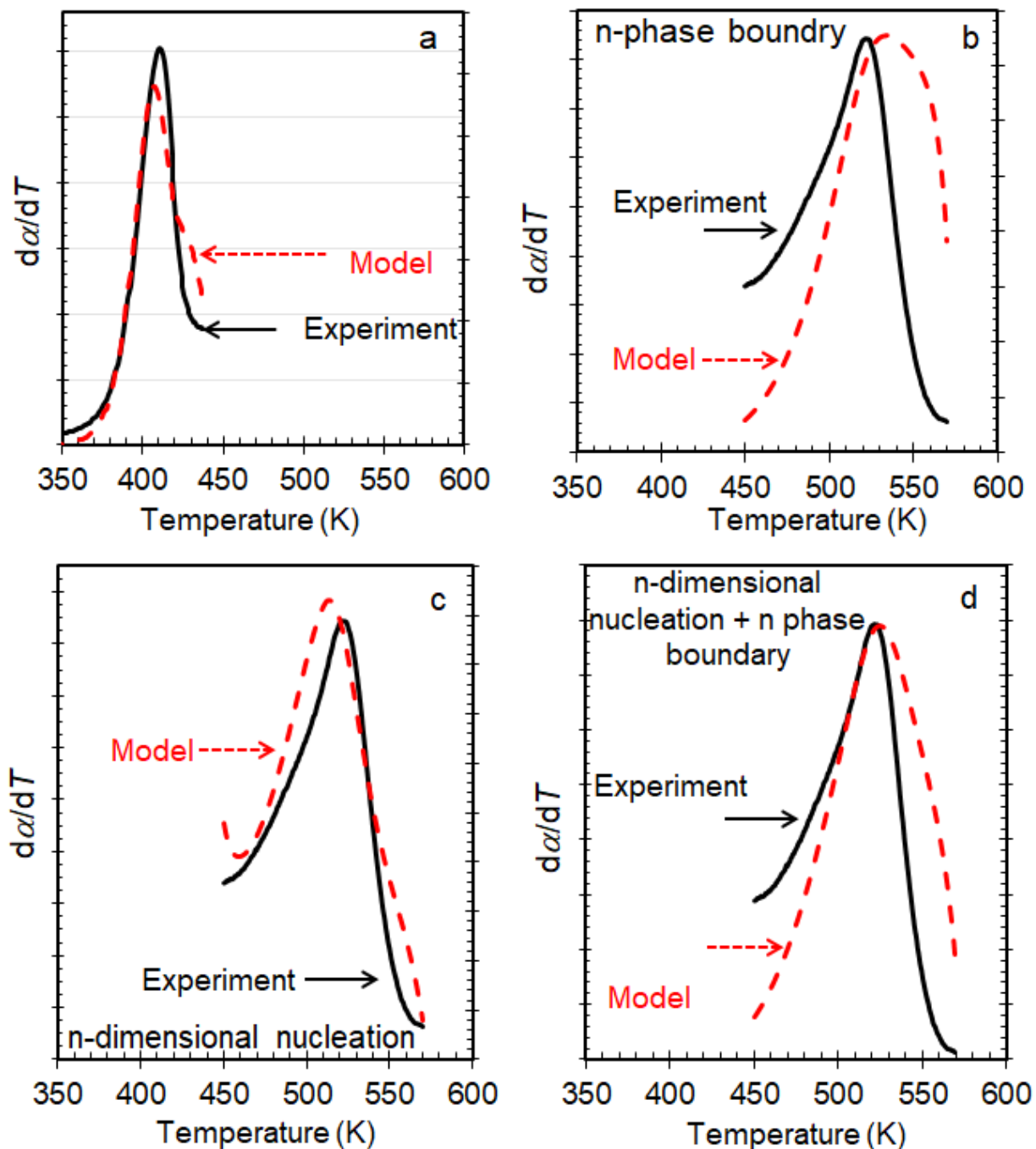


Figure S2

Fitted experimental data and calculated (da/dT) using different reduction models (a: n-order reaction for the first reduction peak, b: Phase boundary-controlled for the second reduction peak, c: n-dimensional nucleation for the second peak, d: A (Phase boundary-controlled) + B (n-dimensional nucleation, with $n = 3$) for the second reduction peak during TPR of 3.5% wt. % $\text{IrO}_2/\text{TiO}_2$ (anatase, $\text{BET} = 55 \text{ m}^2/\text{g}$) with $\beta = 40^\circ\text{C}/\text{min}$.

Best fit for d was found with $n = 3$, $A = 0.2$, and $B = 0.8$

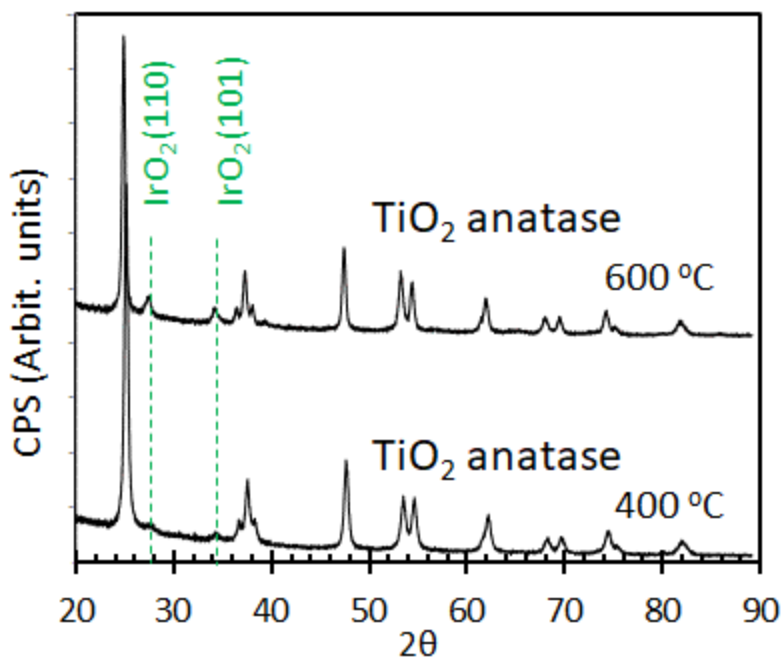


Figure S3.

XRD of 3.5 wt.% IrO₂/TiO₂ (anatase, BET = 55 m²/g) annealed at 400°C and 600°C. No change in the anatase phase is seen. The signal related to IrO₂ becomes more intense. This is due to the effect of temperature on nucleation/crystallization.

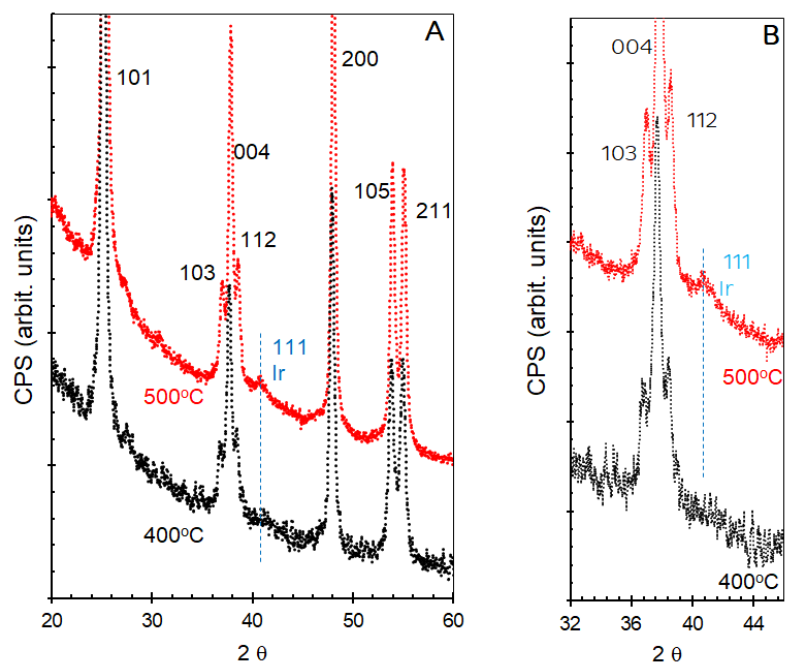


Figure S4

XRD of 3.5 wt.% IrO₂/TiO₂ (anatase, BET = 55 m²/g) reduced at 400°C (black dots) and 500°C (red dots) under 10 mL (10% H₂ in He). The diffraction lines due to TiO₂ (anatase) are given in black. (B) is a magnified region of (A). The presence of crystalline Ir metal (Ir (111) at $2\theta = 40.57^\circ$) is detected for the one reduced at 500°C due to increased crystallinity with temperature.

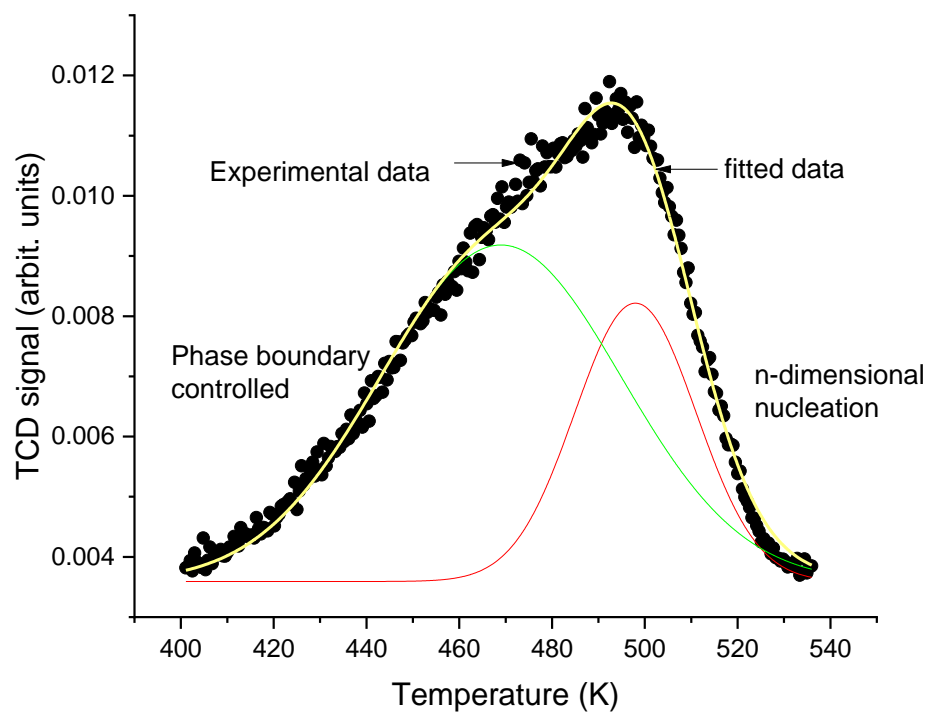


Figure S5:

Deconvoluted experimental data for the second reduction step during TPR of 3.5% wt. % $\text{IrO}_2/\text{TiO}_2$ (anatase, $\text{BET} = 55 \text{ m}^2/\text{g}$) with $\beta = 10^\circ\text{C}/\text{min}$.