

Description of Additional Supplementary Files

File Name: Supplementary Movie 1

Description: Movie describing the structural changes in the Pd nano-octahedron shown in Figure 2 during an oscillatory reaction at a temperature of 380 °C and a gas pressure ratio of $p_{\text{CO}}/p_{\text{O}_2} \approx 0.5$.

File Name: Supplementary Movie 2

Description: Movie describing the structural changes in the truncated Pd nanocube shown in Figure 3 during an oscillatory reaction at a temperature of 420 °C and a gas pressure ratio of $p_{\text{CO}}/p_{\text{O}_2} \approx 0.5$.

File Name: Supplementary Movie 3

Description: Movie describing the structural changes in the truncated Pd nanocube shown in Figure 4 during an oscillatory reaction at a temperature of 460 °C and a gas pressure ratio of $p_{\text{CO}}/p_{\text{O}_2} \approx 0.8$.

File Name: Supplementary Movie 4

Description: Movie describing the structural changes in the truncated Pd nanocube shown in Figure 4 during a reaction in a temperature range of 460 to 540 °C and a gas pressure ratio of $p_{\text{CO}}/p_{\text{O}_2} \approx 2.0$.