

Online Supplementary Information for

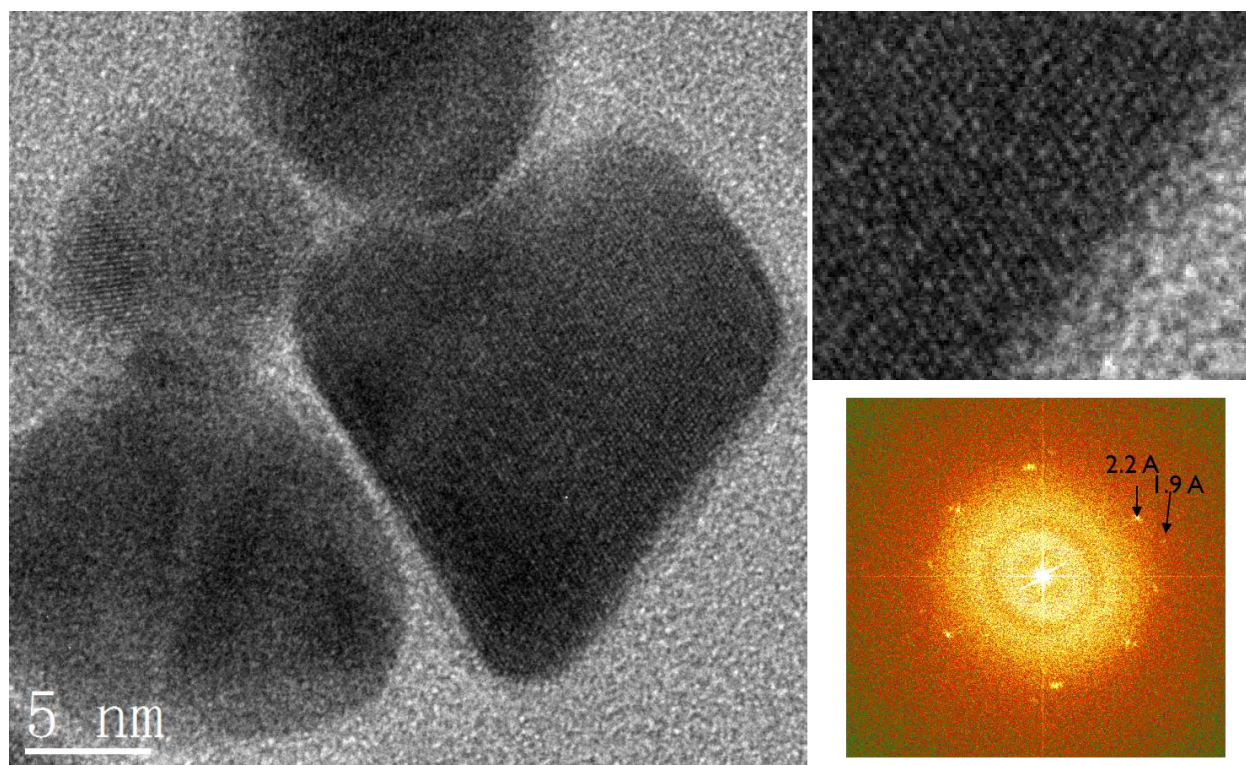
In Situ TEM Study of Catalytic Nanoparticle Reactions in Atmospheric Pressure Gas Environment

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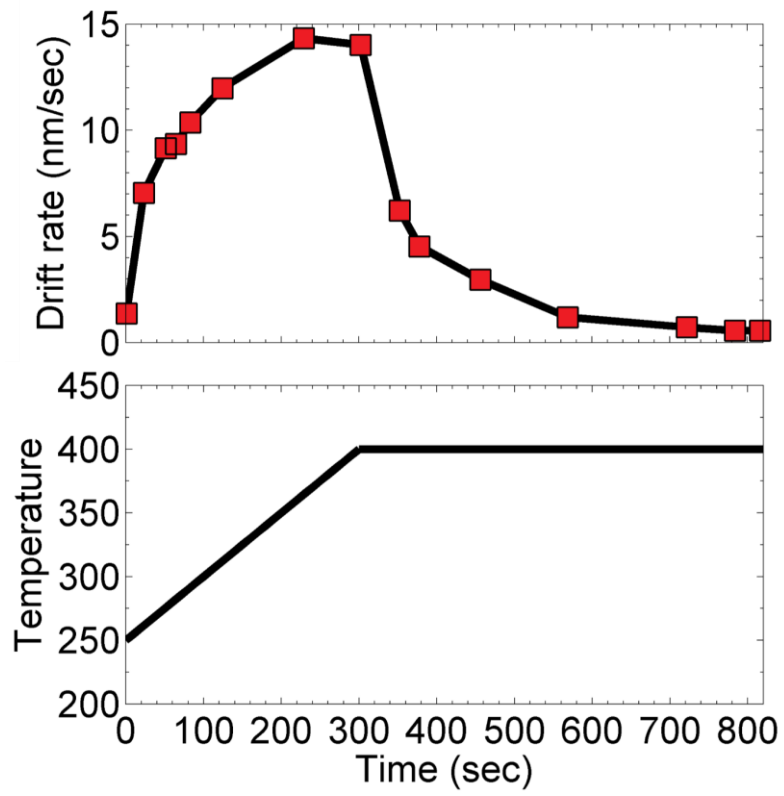
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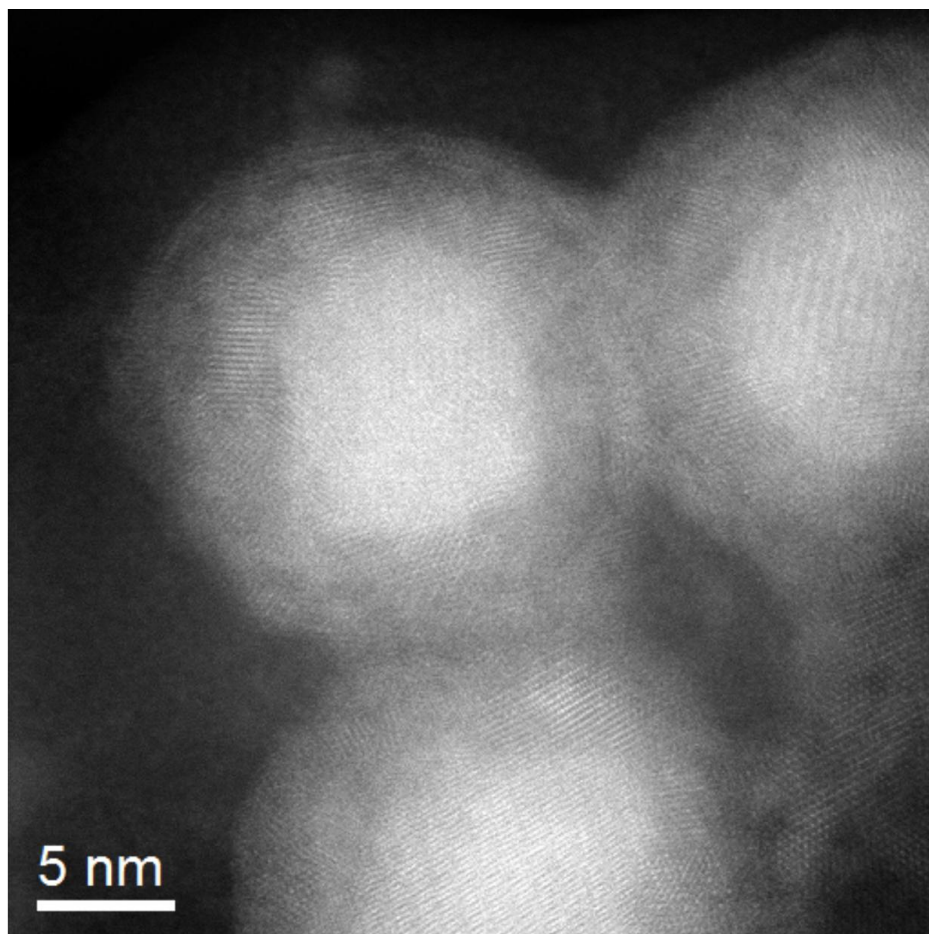
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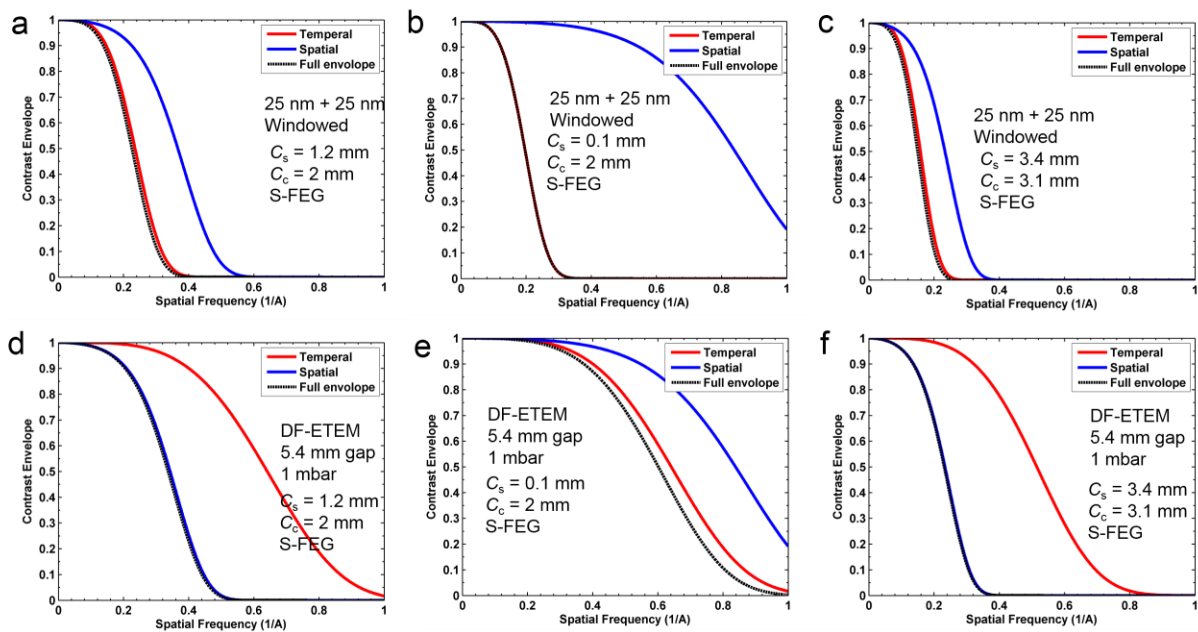
Supplementary Figure 1. Atomic resolution images of Pd particles (Air, 1 bar, no flow).



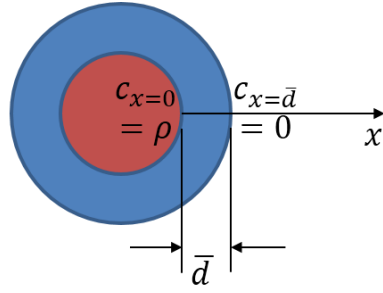
Supplementary Figure 2. Drift rate measured from a traditional furnace-type heating holder (ramping from 250 °C to 400 °C at 0.5 °C/sec ramp rate).



Supplementary Figure 3. ADF-STEM imaging of the initial structures of the cobalt nanoparticles. The metallic particles are passivated with a polycrystalline oxide shell.



Supplementary Figure 4. Information transfer envelope for selected conditions that are listed in Table 1.



$$\begin{aligned}
 J &= -D \frac{dc}{dx} = -D \frac{c_{x=\bar{d}} - c_{x=0}}{\bar{d} - 0} \\
 &= -D \frac{0 - \rho}{\bar{d} - 0} = D \frac{\rho}{\bar{d}}
 \end{aligned}$$

Supplementary Figure 5. Derivation of the equation used in calculation of diffusion coefficient.