

Article

# In Situ Time-Resolved Decomposition of $\beta$ -Hydride Phase in Palladium Nanoparticles Coated with Metal-Organic Framework

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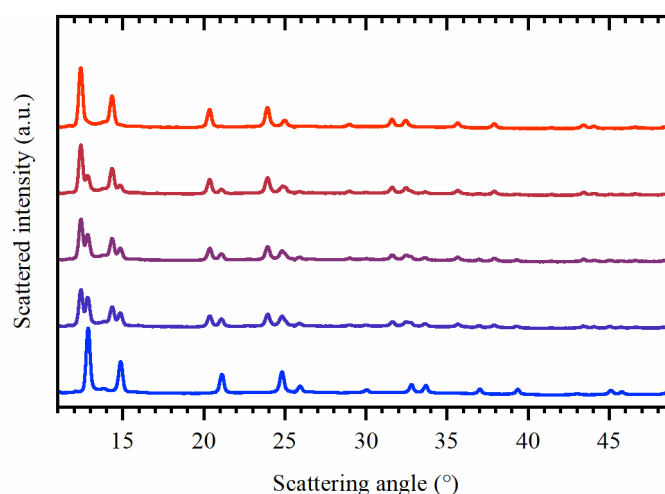
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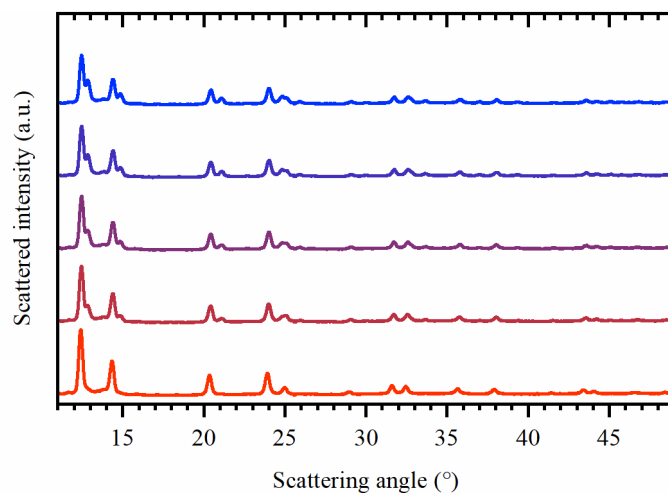
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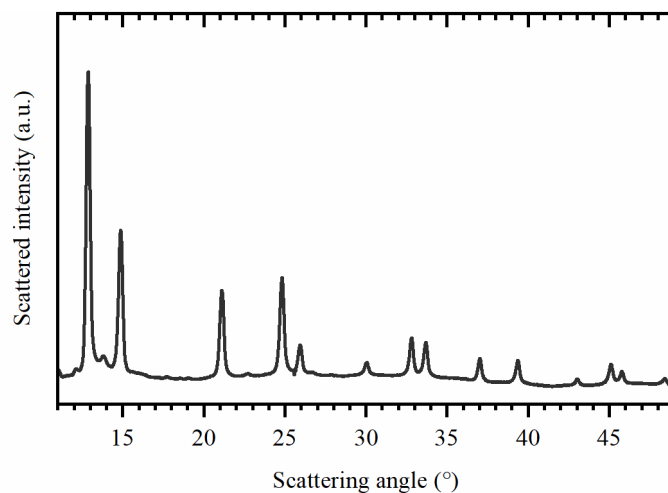
## Supporting Information



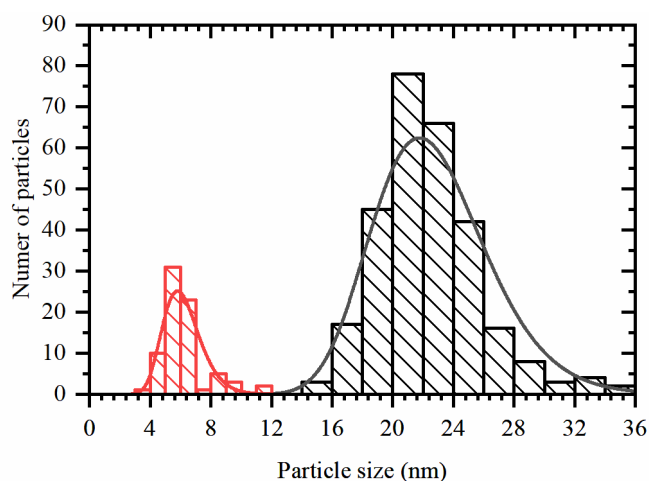
**Figure S1.** In situ XRPD patterns collected with 0.505235 Å radiation during formation of hydride phases Pd@HKUST-1 (from blue to red). The first four spectra are collected within a minute, the last one is after five minutes after sending 2.1 bar hydrogen.



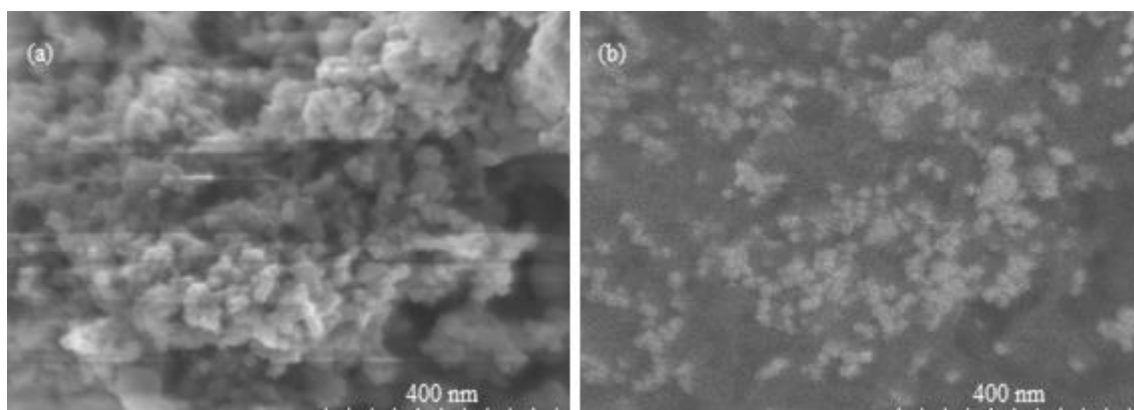
**Figure S2.** XRPD patterns (0.505235 Å radiation) from the first 5 min of the hydrogen desorption from Pd@HKUST-1 reproducing selected data from the whole dataset shown in Figure 4 of the main text. The acquisition time for each pattern was 5 s.



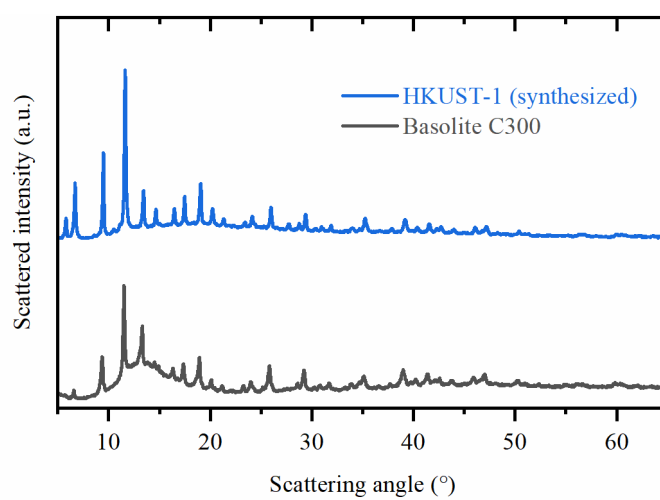
**Figure S3.** XRPD pattern (0.505235 Å radiation) for the Pd@HKUST-1 sample after complete hydrogen desorption at 120 °C.



**Figure S4.** TEM distribution of bigger (black) and smaller (red) particles.



**Figure S5.** SEM image for Pd@HKUST-1 material measured in SE (a) and HA-BSE (b) regimes.



**Figure S6.** XRPD patterns (Cu  $K\alpha$  radiation) for synthesized HKUST-1 (blue) and reference Basolite C300 sample (black).