

Supporting Information for
CO Poisoning and CO Hydrogenation on the Surface of Pd Hydrogen Separation
Membranes

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S.1. Deactivation of Pd from $\text{Ni}(\text{CO})_4$ impurities

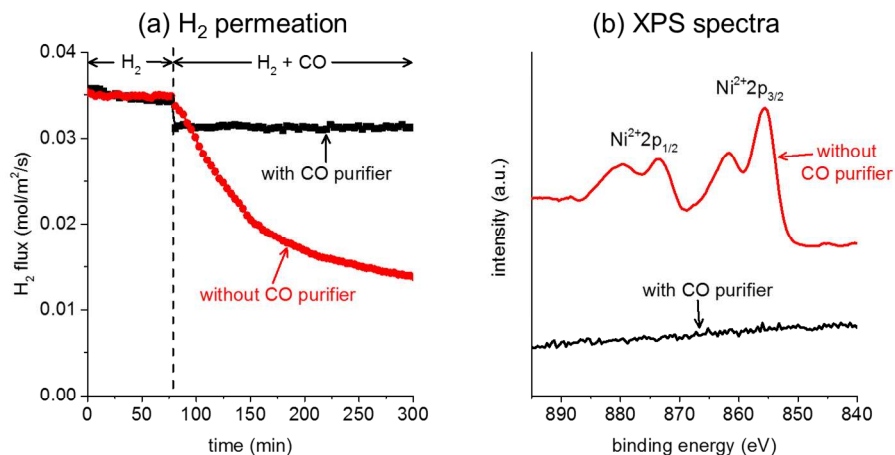


Figure S1. (a) H_2 flux across a 25 μm -thick Pd membrane during exposure to 50% H_2 in N_2 at 513 K during the first 80 minutes of the reaction, and then during exposure to a 5%CO/50% H_2 / N_2 gas mixture with a CO purifier (black) and without a CO purifier (red). (b) X-ray photoelectron (XPS) spectra of the Pd membrane surfaces following 300 minutes exposure to a 5%CO/50% H_2 / N_2 gas mixture with a CO purifier (black) and without a CO purifier (red) at 513 K. Transient deactivation of the membrane without the CO purifier (a) is due to the accumulation of Ni deposits on the membrane surface (b) from $\text{Ni}(\text{CO})_4$ impurities in the CO gas bottle, which can be effectively removed by installing a CO gas purifier.

S.2. Surface IRAS spectra collected during H₂/CO exposure in the 373-533 K range

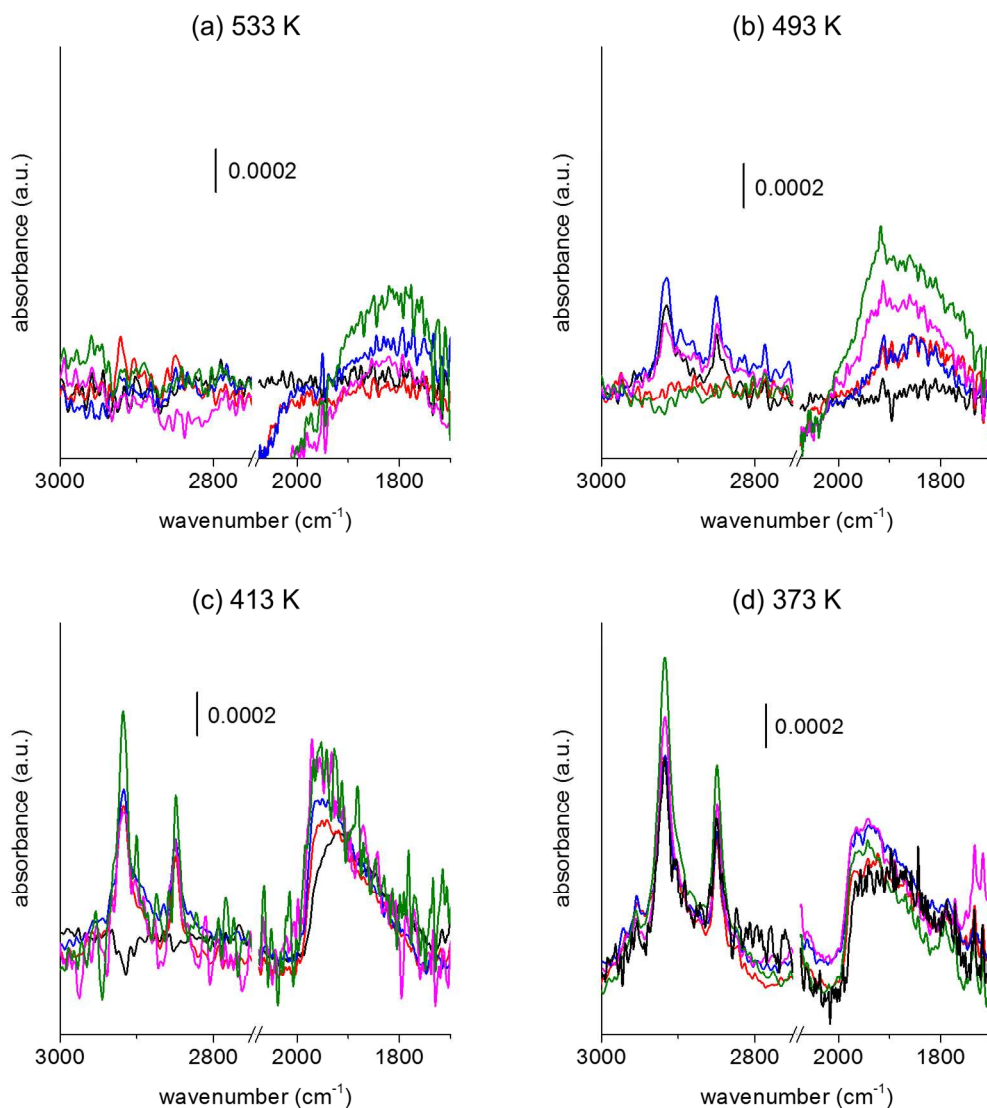


Figure S2. IRAS spectra collected during exposure of a 25- μ m-thick Pd foil membrane to 50% H₂ and 0.05% CO (black), 0.5% CO (red), 1% CO (blue), 3% CO (magenta), and 5% CO (olive) at (a) 533 K, (b) 493 K, (c) 413 K, and (d) 373 K. IRAS spectra were recorded while the H₂ fluxes in Figure 3 were measured simultaneously.