Supporting Information

Effects of Alloying Gold to Palladium in Furfural Hydrogenation Probed by *in situ* ATR-IR Spectroscopy and Density Functional Theory (DFT).

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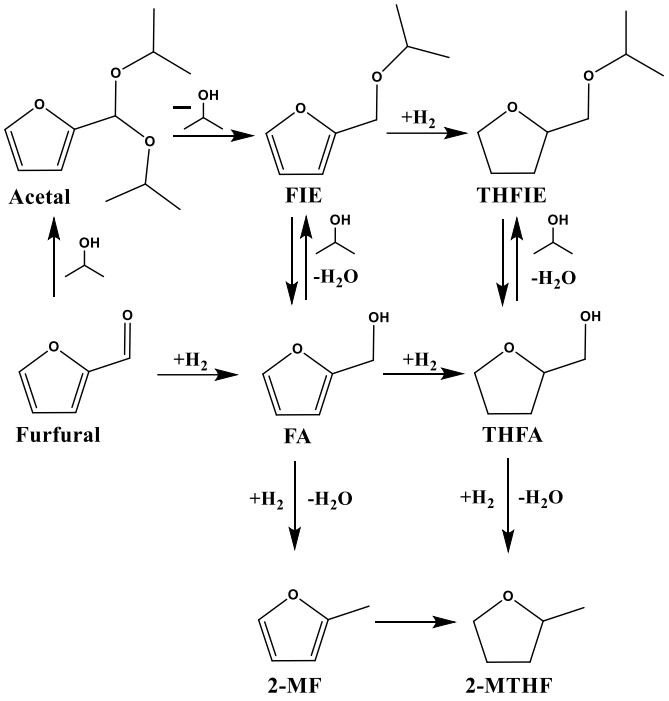

Figure S.1. Furfural Hydrogenation Pathways

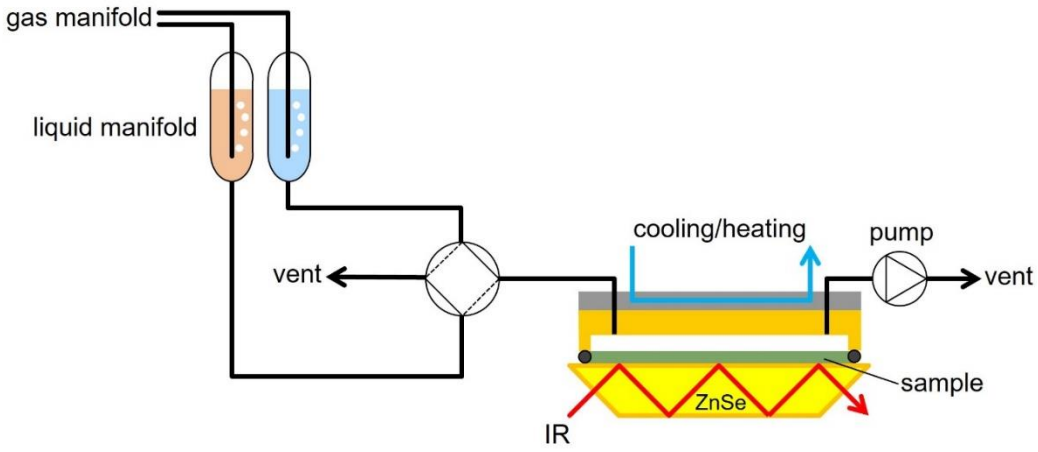

Figure S.2 schematic drawing of the in situ ATR-IR setup with section of the spectroscopic cell.

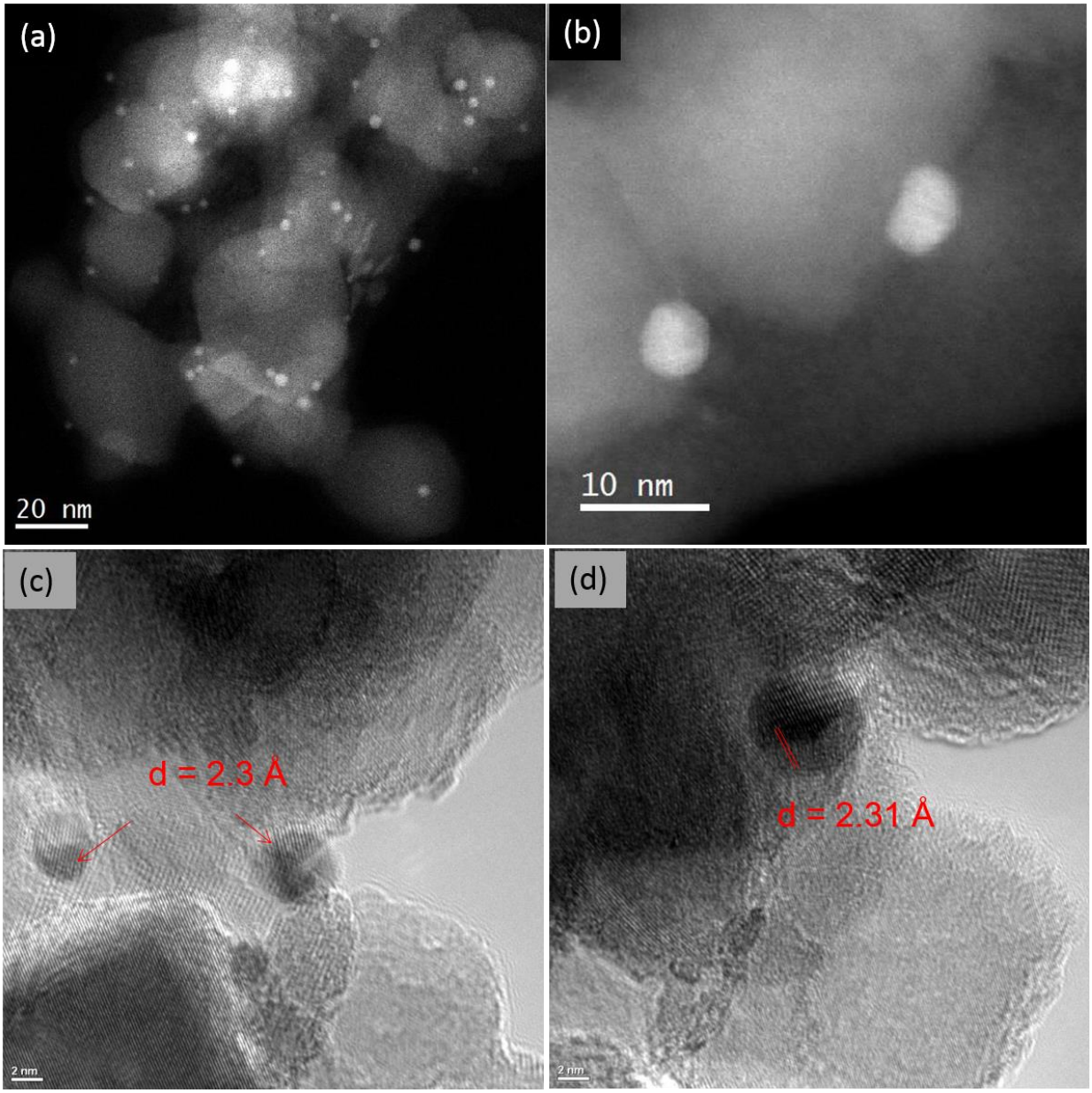

Figure S.3 (a-b) HAADF-STEM images of AuPd/TiO_2 showing the typical size and morphology of the nanoparticles supported on TiO_2. (c-d) HRTEM images of of AuPd/TiO_2 showing the crystal spacing measured.

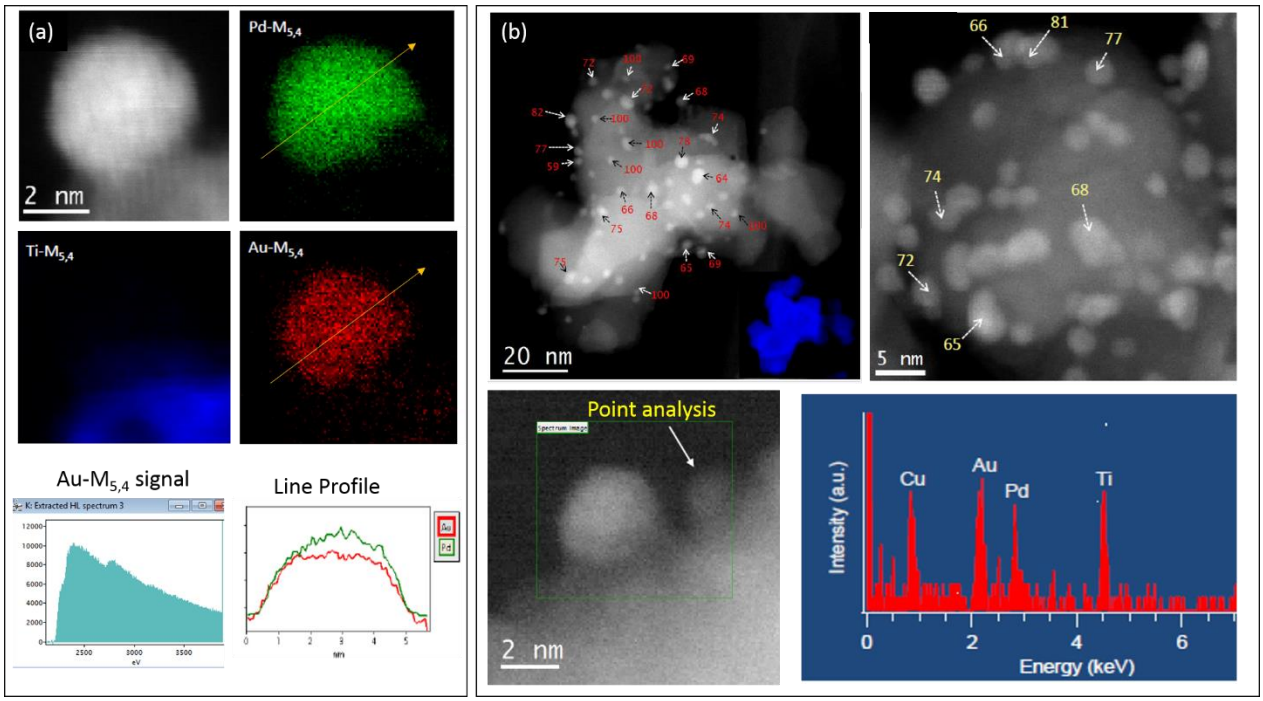

Figure S.4 (a) Representative HAADF-STEM image of a bimetallic particle and corresponding elemental maps obtained by EELS of AuPd/TiO_2. The Au-$M_{5,4}$ EELS signal obtained and the line profile taken across the particle are included. (b) Quantitative XEDS analysis of the atomic percentage of Au determined in several individual particles of AuPd/TiO_2. The analysis of individual particles was conducted via point analysis methodology and quantitative measurement of each spectrum using Cliff–Lorimer criteria of Au-L_α and Pd-L_α series, as shown at the bottom.

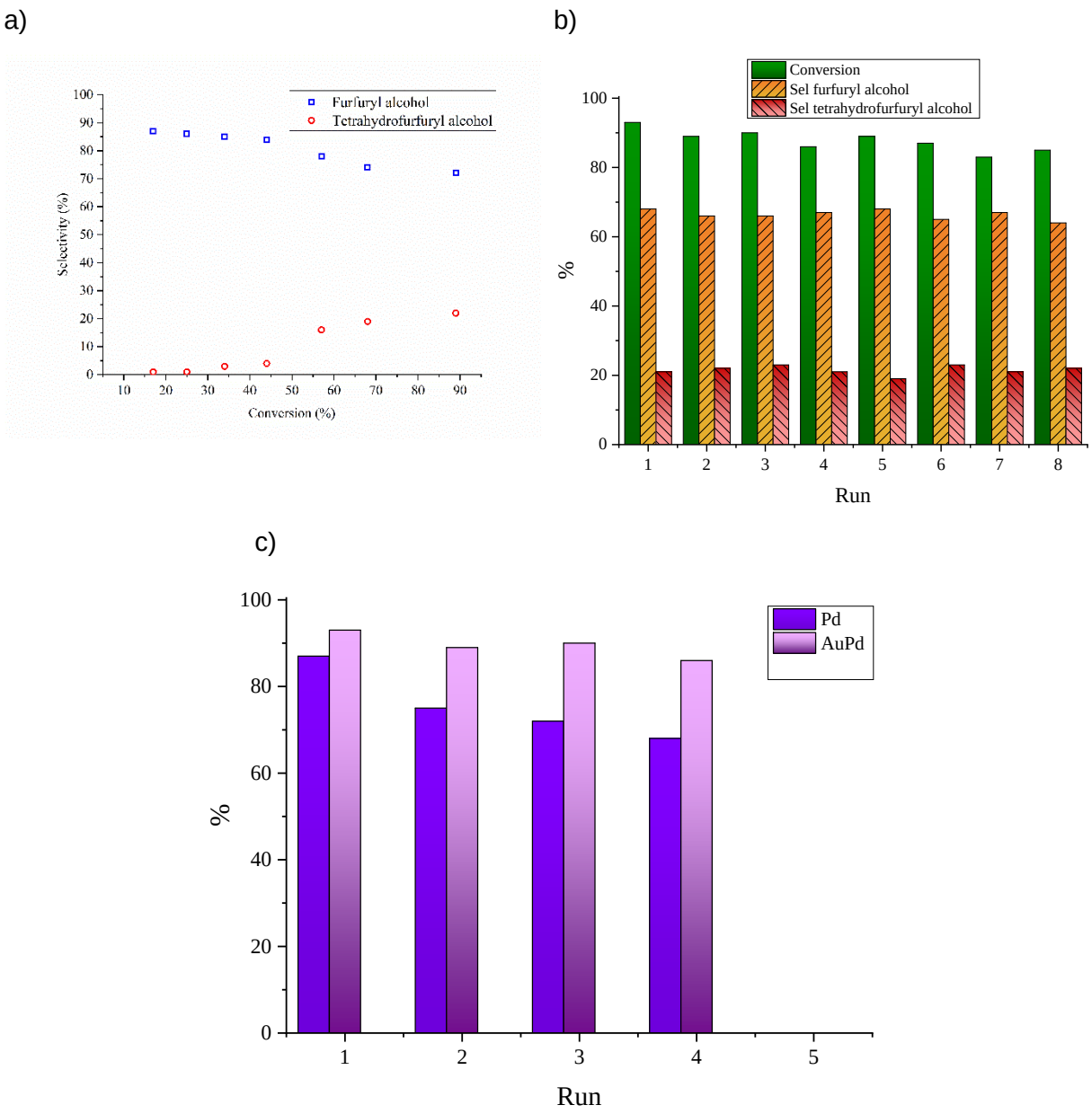

Figure S.5 Insights on the catalytic performance of AuPd/TiO_2 catalyst: a) Selectivity versus conversion plot for the two main products (FA and THFA); b) Results from stability tests on AuPd/TiO_2 catalyst and c) comparison of stability for Pd and AuPd catalysts (Reactions conditions: Furfural = 0.3 M; FF/metal ratio=500 wt/wt, 50 °C, 1 bar H_2 t = 5 h)