

## SUPPORTING INFORMATION

### One-pot organometallic synthesis of alumina-embedded Pd nanoparticles

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#### Table of content

Figure S1: <sup>1</sup>H NMR spectra of initial reactants Al(iPrO)<sub>3</sub> (a), Pd<sub>2</sub>(dba)<sub>3</sub> (b) and their mixture (c).

Figure S2: <sup>13</sup>C NMR spectra of initial reactants Al(iPrO)<sub>3</sub> (a), Pd<sub>2</sub>(dba)<sub>3</sub> (b) and their mixture (c).

Figure S3: <sup>1</sup>H NMR spectra of the mixture of Al(iPrO)<sub>3</sub> and Pd<sub>2</sub>(dba)<sub>3</sub> before (a) and after (b) reaction.

Figure S4: <sup>13</sup>C NMR spectra of the mixture of Al(iPrO)<sub>3</sub> and Pd<sub>2</sub>(dba)<sub>3</sub> before (a) and after (b) reaction.

Figure S5: TEM image obtained for Pd-AIP. (a) 1<sup>st</sup> synthesis and (b) 2<sup>nd</sup> synthesis under 3 bar H<sub>2</sub>, r.t.

Figure S6: TEM image obtained for Pd-AIP nanomaterial after 20 h under 3 bar H<sub>2</sub>.

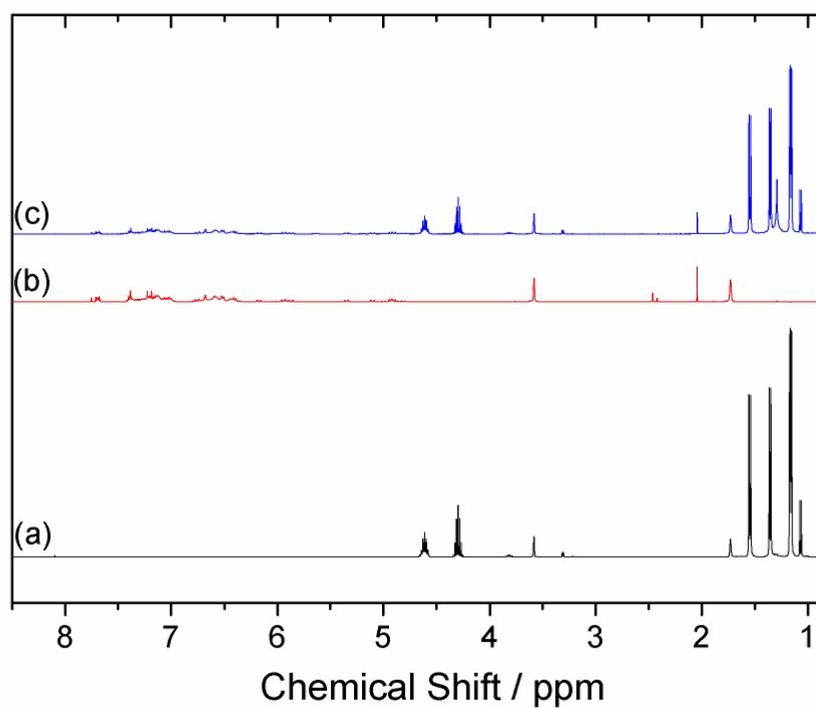


Figure S1:  $^1\text{H}$  NMR spectra of initial reactants  $\text{Al}(\text{iPrO})_3$  (a),  $\text{Pd}_2(\text{dba})_3$  (b) and their mixture (c).

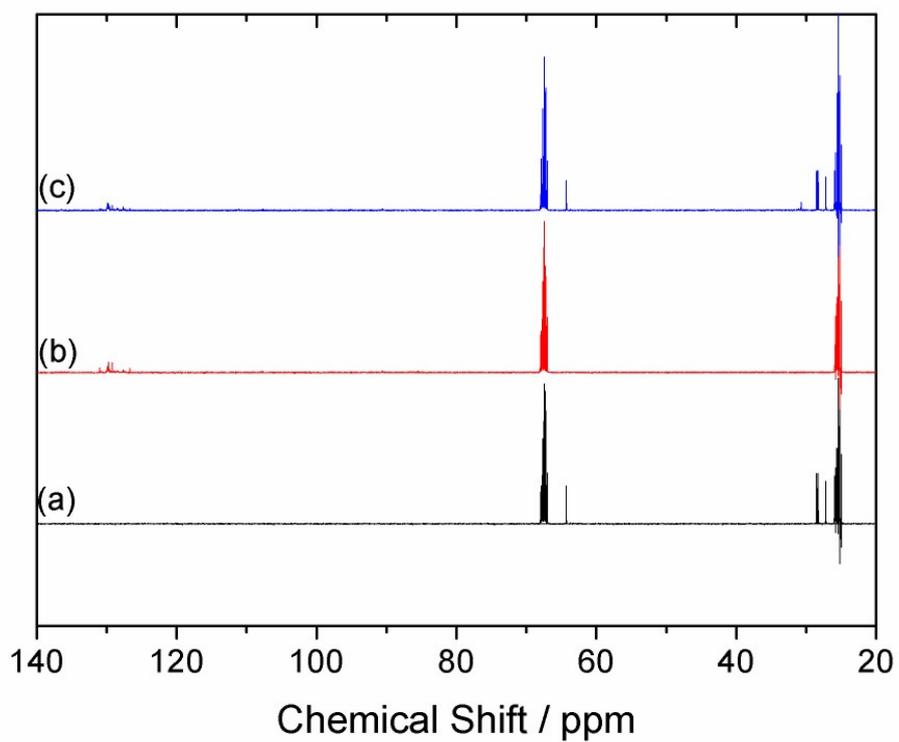


Figure S2:  $^{13}\text{C}$  NMR spectra of initial reactants  $\text{Al}(\text{iPrO})_3$  (a),  $\text{Pd}_2(\text{dba})_3$  (b) and their mixture (c).

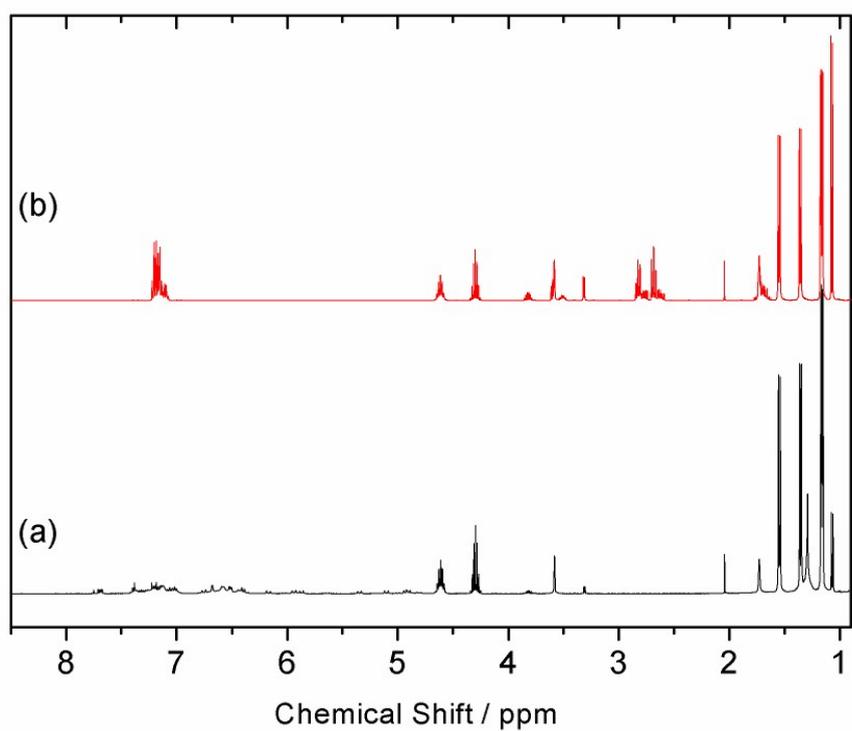


Figure S3: <sup>1</sup>H NMR spectra of the mixture of Al(iPrO)<sub>3</sub> and Pd<sub>2</sub>(dba)<sub>3</sub> before (a) and after (b) reaction.

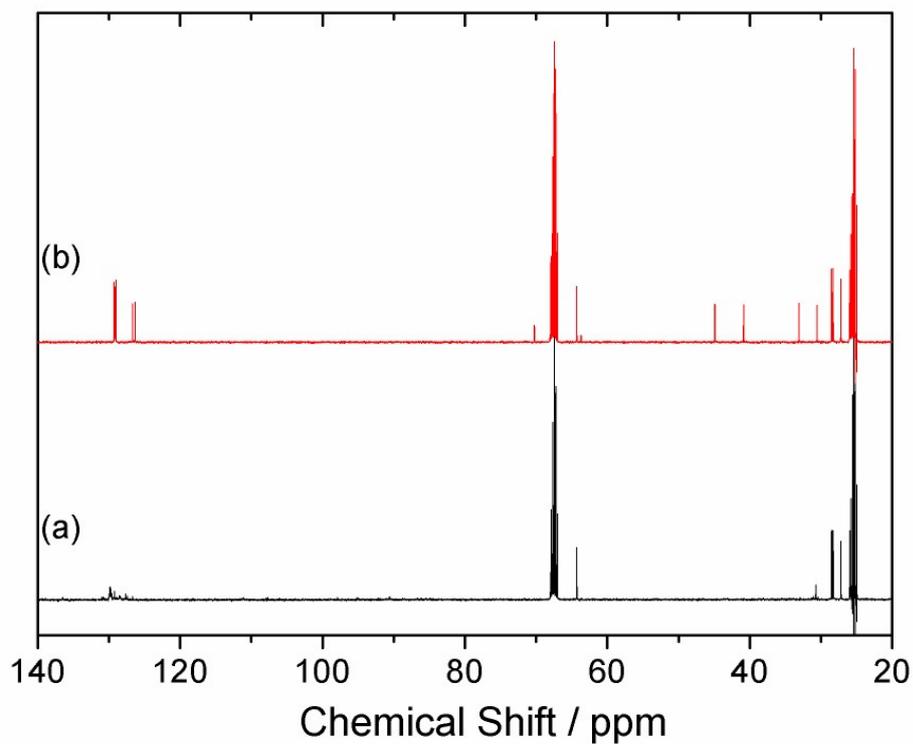


Figure S4: <sup>13</sup>C NMR spectra of the mixture of Al(iPrO)<sub>3</sub> and Pd<sub>2</sub>(dba)<sub>3</sub> before (a) and after (b) reaction.

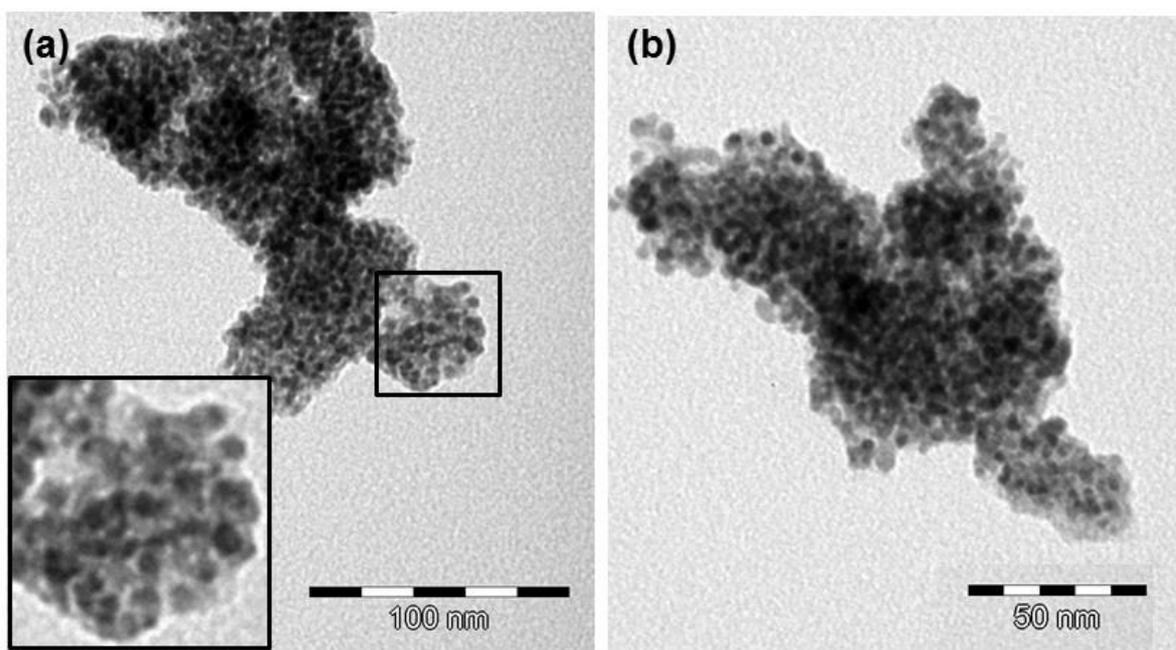


Figure S5: TEM image obtained for Pd-AIP. (a) 1<sup>st</sup> synthesis and (b) 2<sup>nd</sup> synthesis under 3 bar H<sub>2</sub>, r.t.

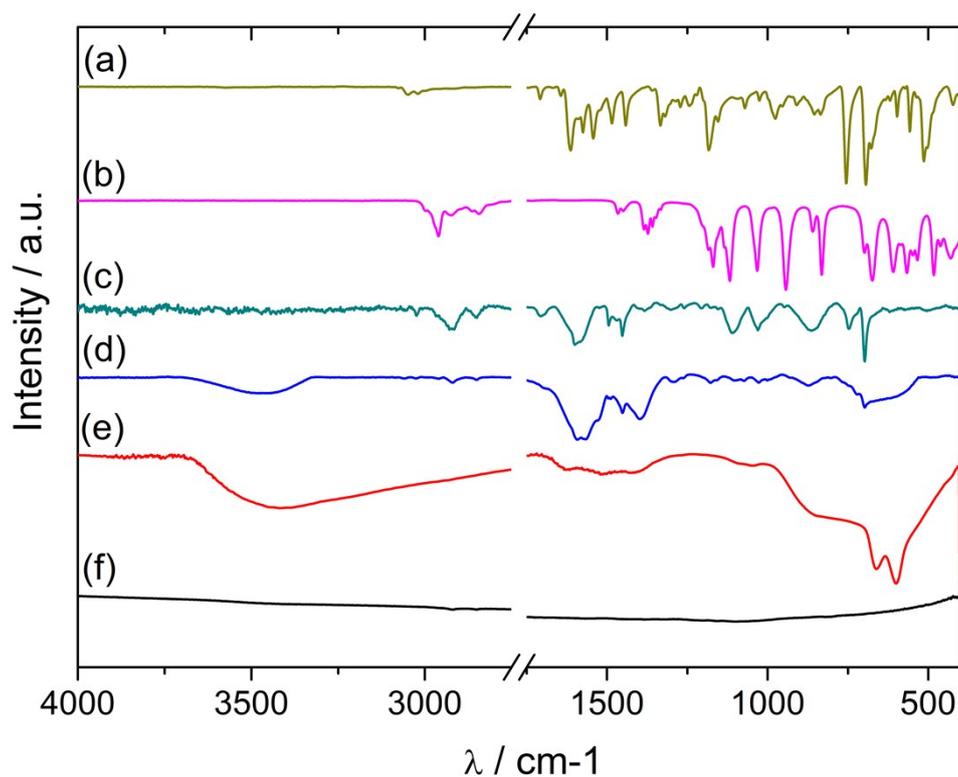


Figure S6: FT-IR spectra of (a) Pd<sub>2</sub>dba<sub>3</sub>, (b) Al(iPrO)<sub>3</sub>, (c) Pd-AIP, (d) Pd-AIP after 1 week of air exposition, (e) Pd-AIP-773K, and (f) Pd-bulk

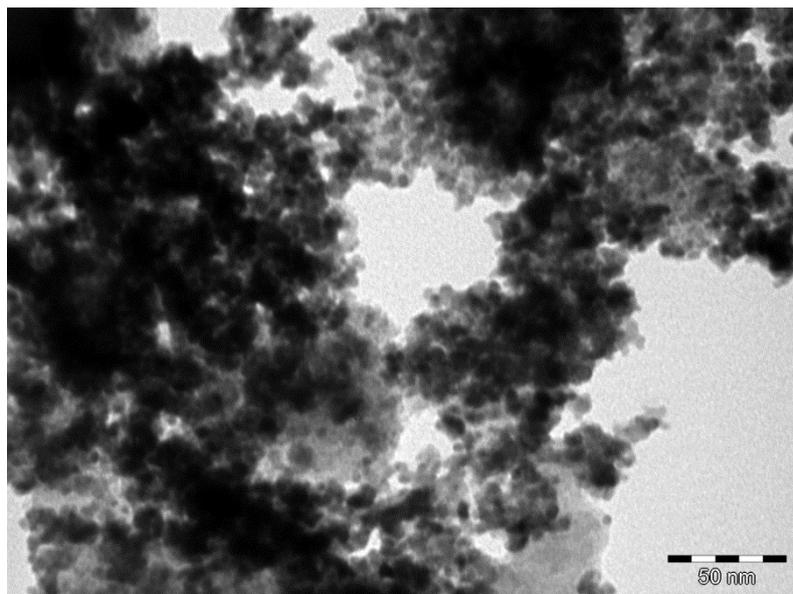


Figure S7: TEM image obtained for Pd-AIP nanomaterial after 20h under 3 bar  $H_2$ .