## **Supplementary Material**

## Complex-assisted PtZn alloy formation for propane dehydrogenation

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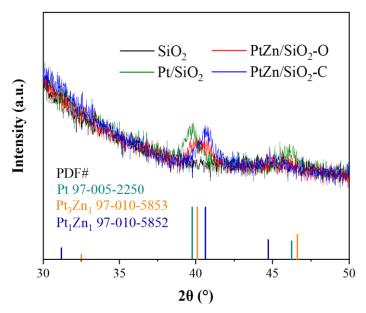


Figure S1. XRD patterns of SiO<sub>2</sub> support and reduced catalysts.

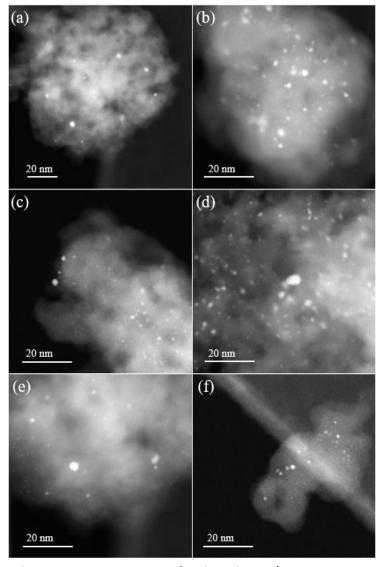


Figure S2. Additional HAADF-STEM images of reduced PtZn/SiO<sub>2</sub>-O.

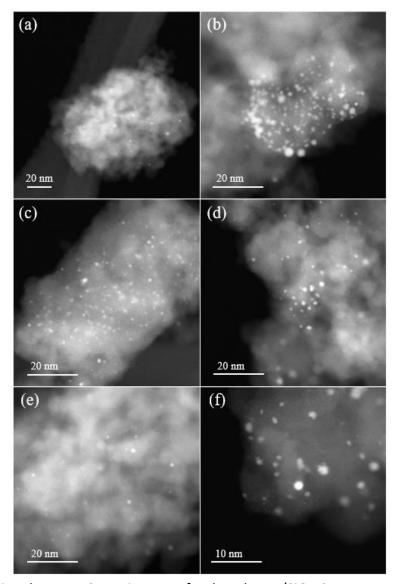


Figure S3. Additional HAADF-STEM images of reduced PtZn/SiO<sub>2</sub>-C.

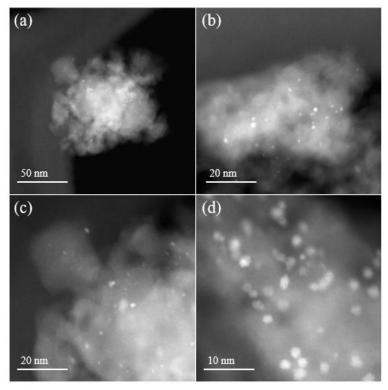
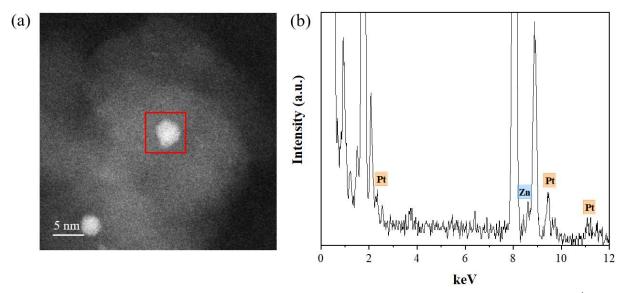


Figure S4. Additional HAADF-STEM images of reduced Pt/SiO<sub>2</sub>.



**Figure S5.** Energy dispersive X-ray spectrum of PtZn alloy nanoparticle in reduced PtZn/SiO<sub>2</sub>-O.

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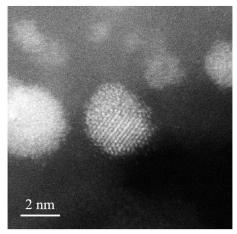
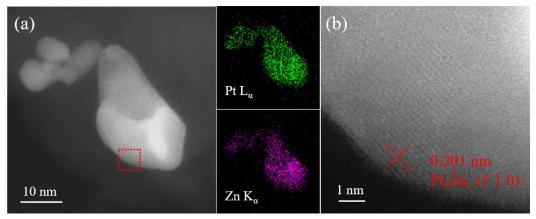


Figure S6. PtZn particle with ordered structure in reduced PtZn/SiO<sub>2</sub>-C.



**Figure S7.** (a) EDS mapping of the big  $Pt_1Zn_1$  particle in reduced  $PtZn/SiO_2$ -C and (b) the lattice spacing measured in the highlighted area.

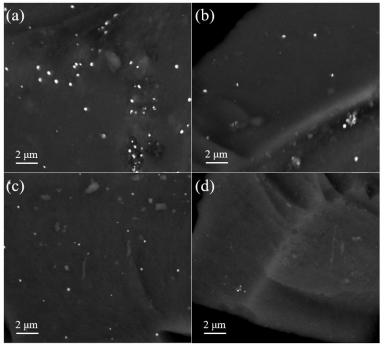


Figure S8. SEM-BSD images of reduced PtZn/SiO<sub>2</sub>-O.

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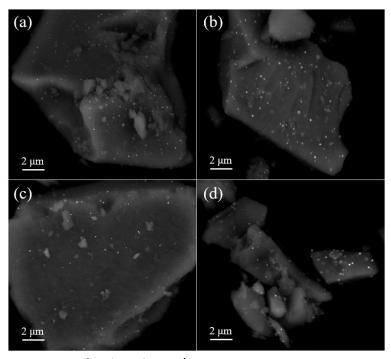


Figure S9. SEM-BSD images of reduced PtZn/SiO<sub>2</sub>-C.

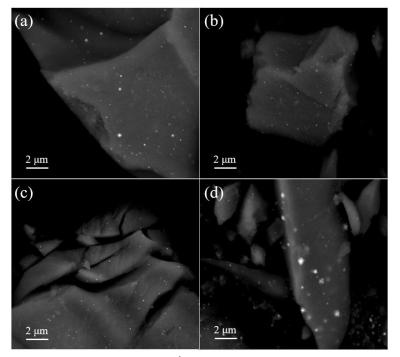


Figure \$10. SEM-BSD images of reduced Pt/SiO<sub>2</sub>.