Supplementary Information: Design of PtZn Nano Alloys through Interface Tailoring via Atomic Layer Deposition for Propane Dehydrogenation

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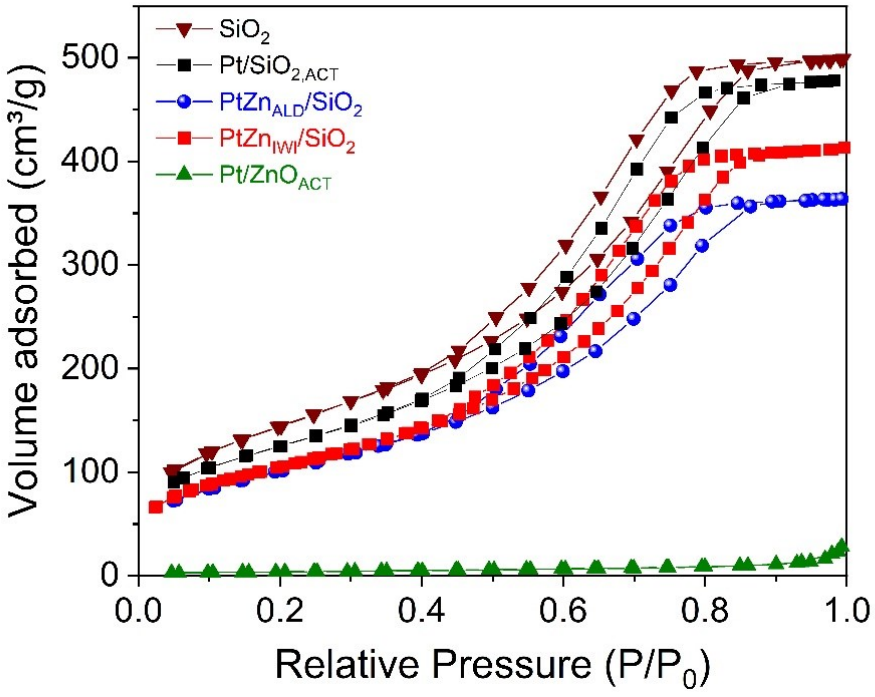


Figure S1. N_2 sorption isotherm of activated catalysts.

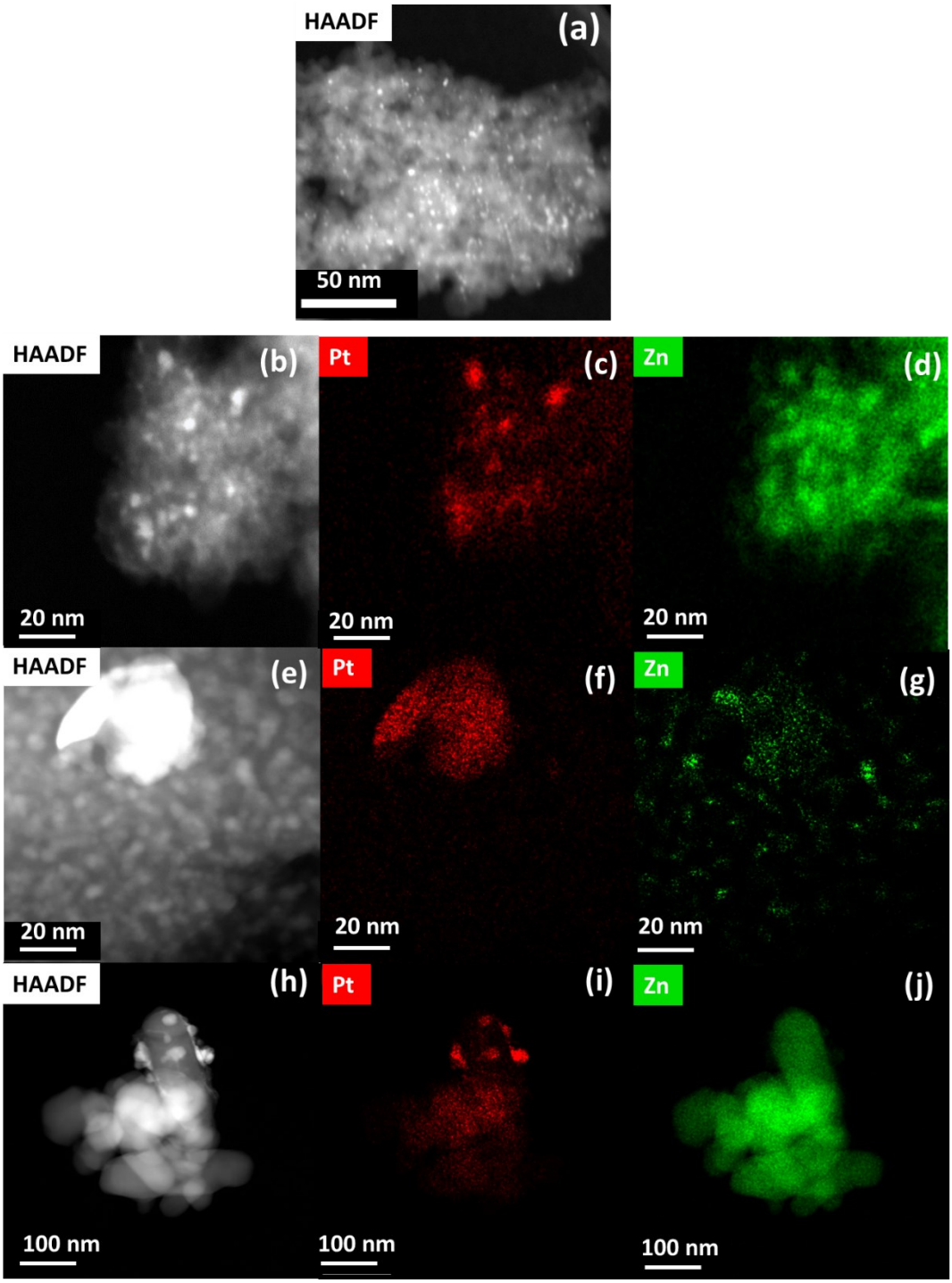


Figure S2. HAADF- STEM images and EDX maps of Pt and Zn in as synthesized (a) Pt/SiO_2, (b-d) $Pt/ZnO_{ALD}/SiO_2$, (e-g) $Pt/ZnO_{IWI}/SiO_2$ and (h-j) Pt/ZnO

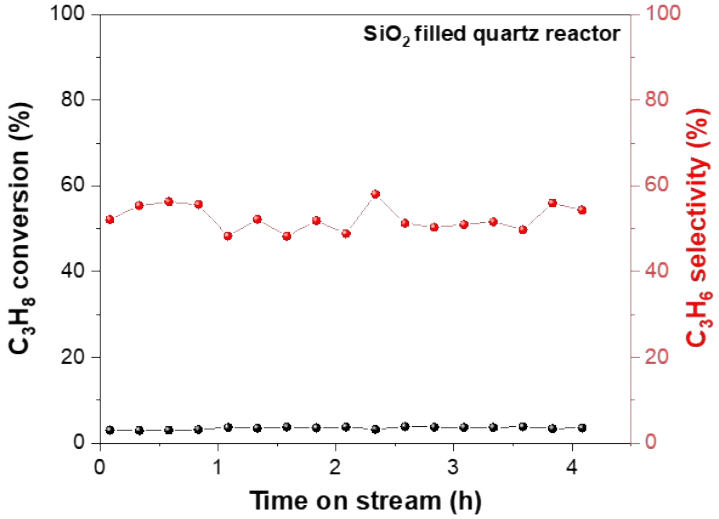


Figure S3. Propane dehydrogenation over blank quartz reactor filled with SiO_2 support at 600°C, atmospheric pressure and 50 mL/min of 20 vol.% C_3H_8/He flow. The conversion of propane was stable at 3% while selectivity to propylene was close to 53%. This activity can be rationalized by thermal dehydrogenation of propane.

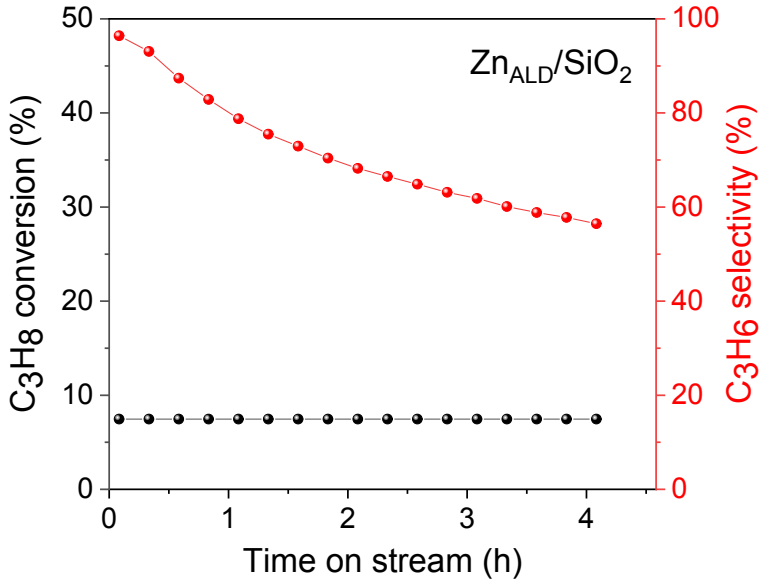


Figure S4. Propane dehydrogenation over Zn_{ALD}/SiO_2 , (prepared via 1 cycle of ZnO ALD onto SiO2) measured at 600°C, atmospheric pressure and 50 mL/min of 20 vol.% C3H8/He flow.

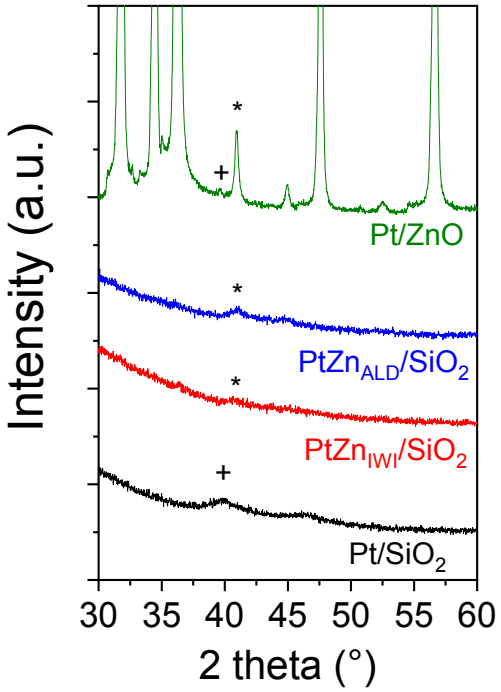


Figure S5. XRD analysis of spent catalyst. (+: Pt and * Pt_1Zn_1)

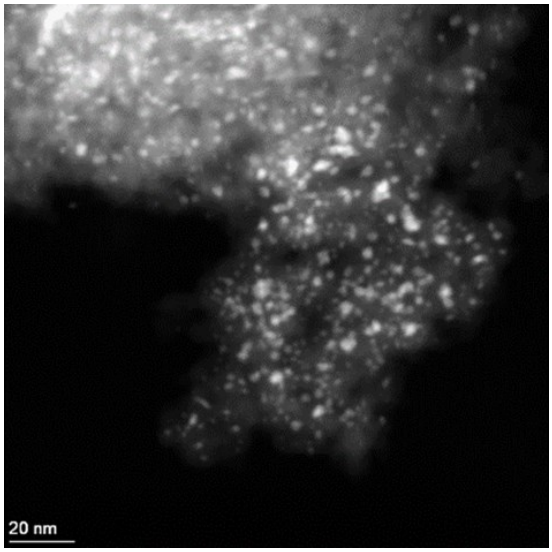
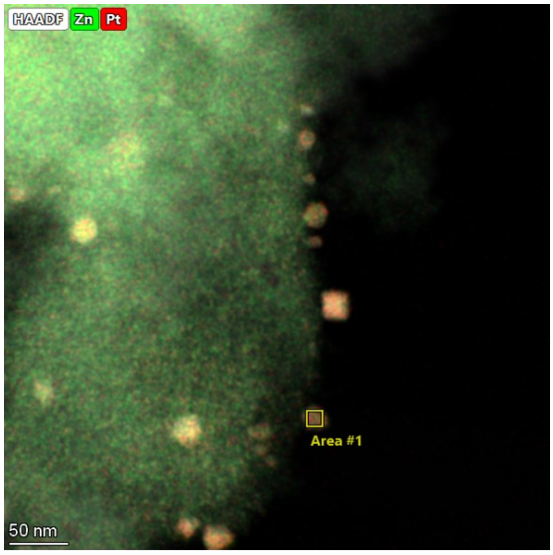
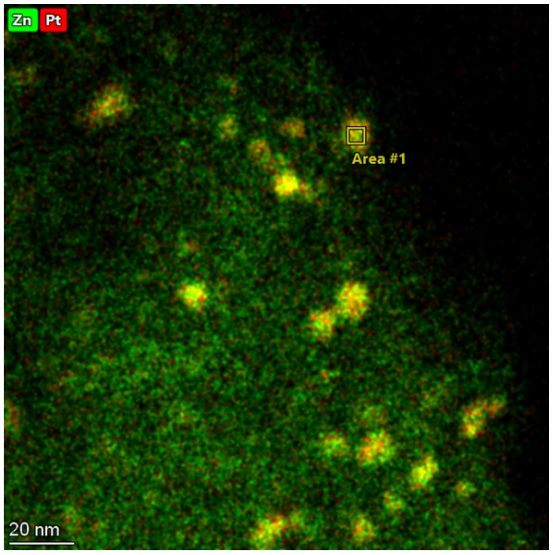


Figure S6. HAADF-STEM image of the spent Pt/SiO_2 catalyst.





Z	Element	Family	Atomic Fraction (%)
30	Zn	K	54.5
78	Pt	L	45.5

Z	Element	Family	Atomic Fraction (%)
30	Zn	K	53
78	Pt	L	47

Figure S7. STEM EDX and elemental mapping of $PtZn_{ALD}/SiO_2$ after reaction, indicating the atomic fraction of Pt and Zn, in agreement with the formation of Pt_1Zn_1 alloy.

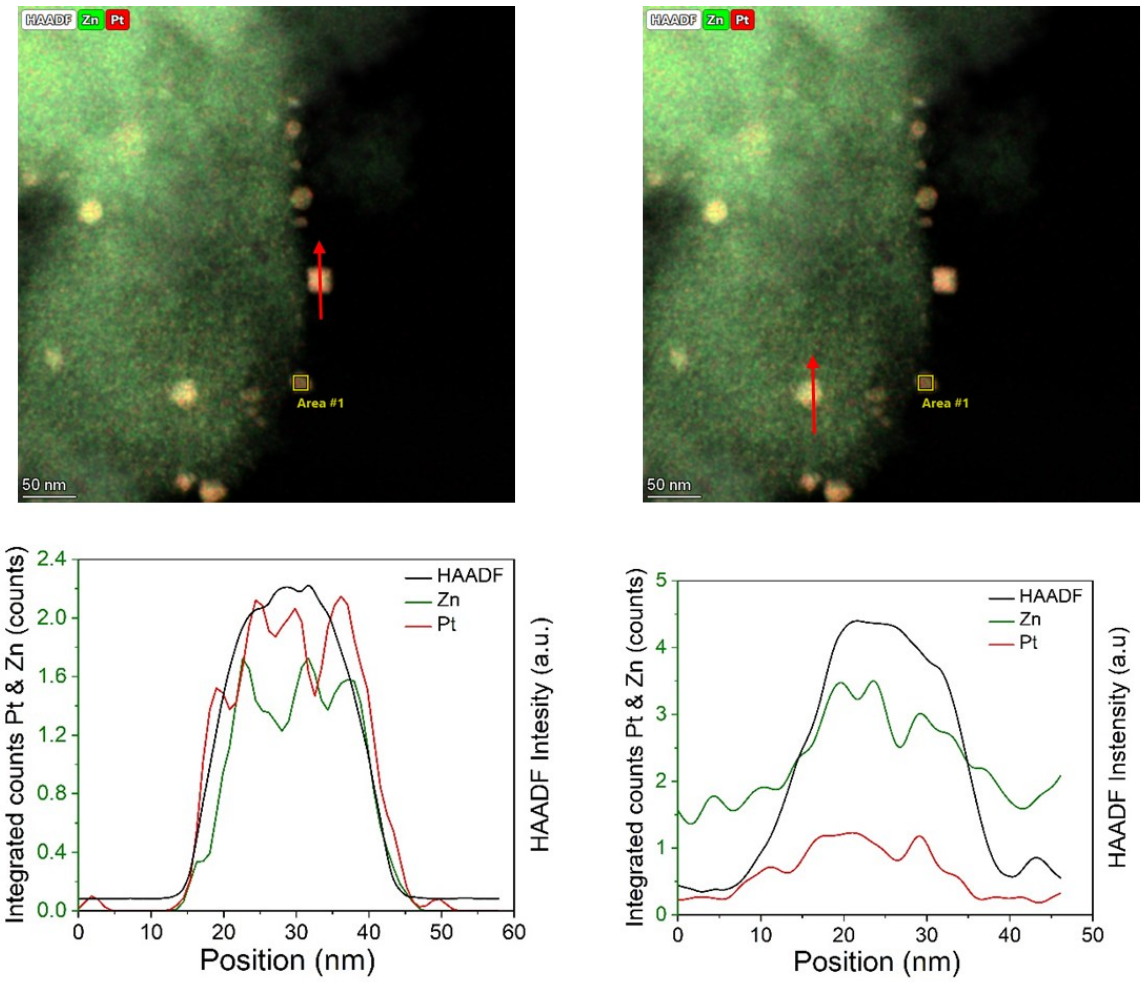


Figure S8. EDX mapping and line scan analysis on Pt_1Zn_1 nanoalloy particles in $PtZn_{ALD}/SiO_2$, sitting at edge and in middle of support where the effect of Zn form ZnO under-layer can be seen.