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Supporting Information

Efficient catalytic deoxidation of the Zr-modified Pd-based industrial catalyst

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Fig. S1 Industrial Al_2O_3, industrial Zr-Pd/Al_2O_3 catalyst and vacuum drum.

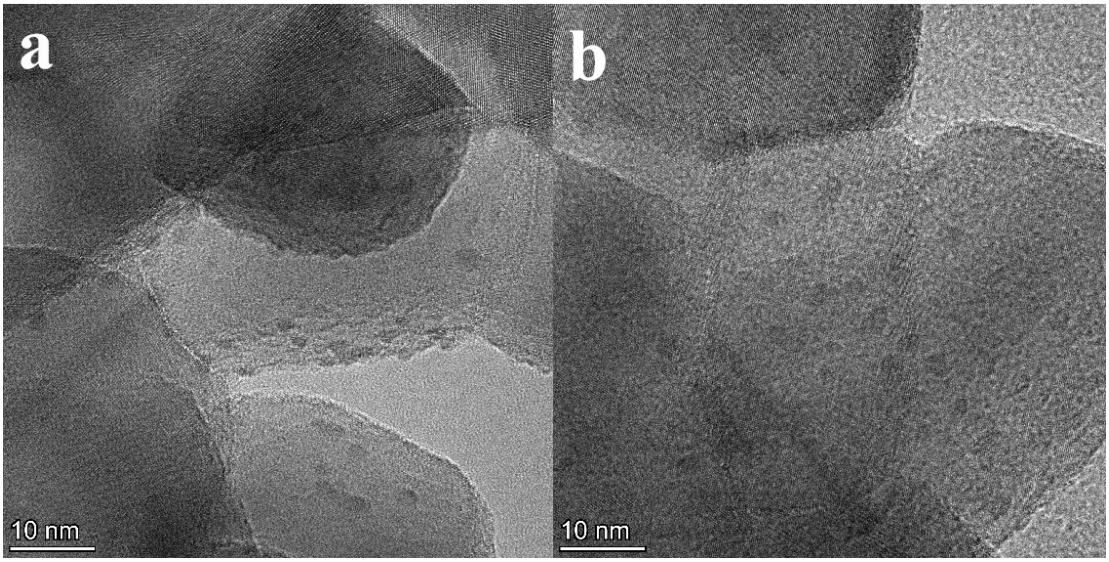

Fig. S2 HR-TEM images for the used Pd/Al_2O_3 catalyst (a) and Zr-Pd/Al_2O_3 catalyst (b).

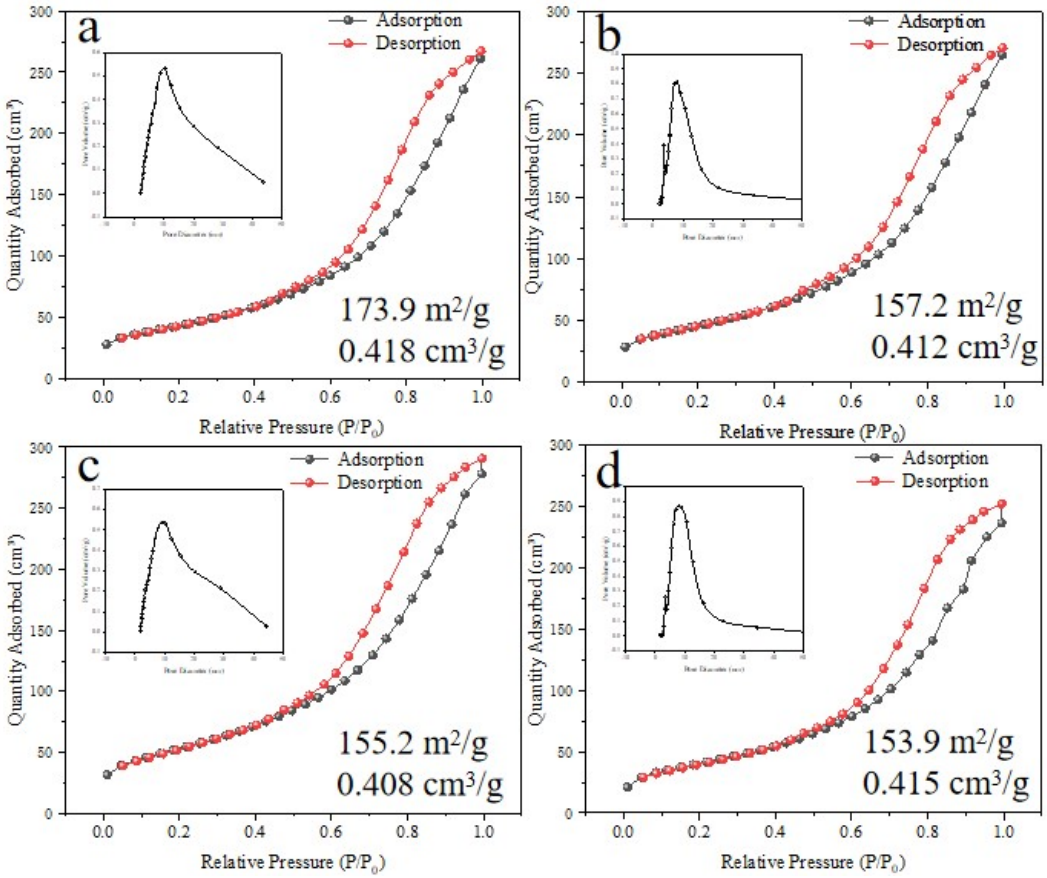

Fig. S3 N_2 adsorption-desorption isotherm of different fresh catalysts：Pd/Al_2O_3(a), Zr-Pd/Al_2O_3(b), Ce-Pd/Al_2O_3(c), Cu-Pd/Al_2O_3(d).

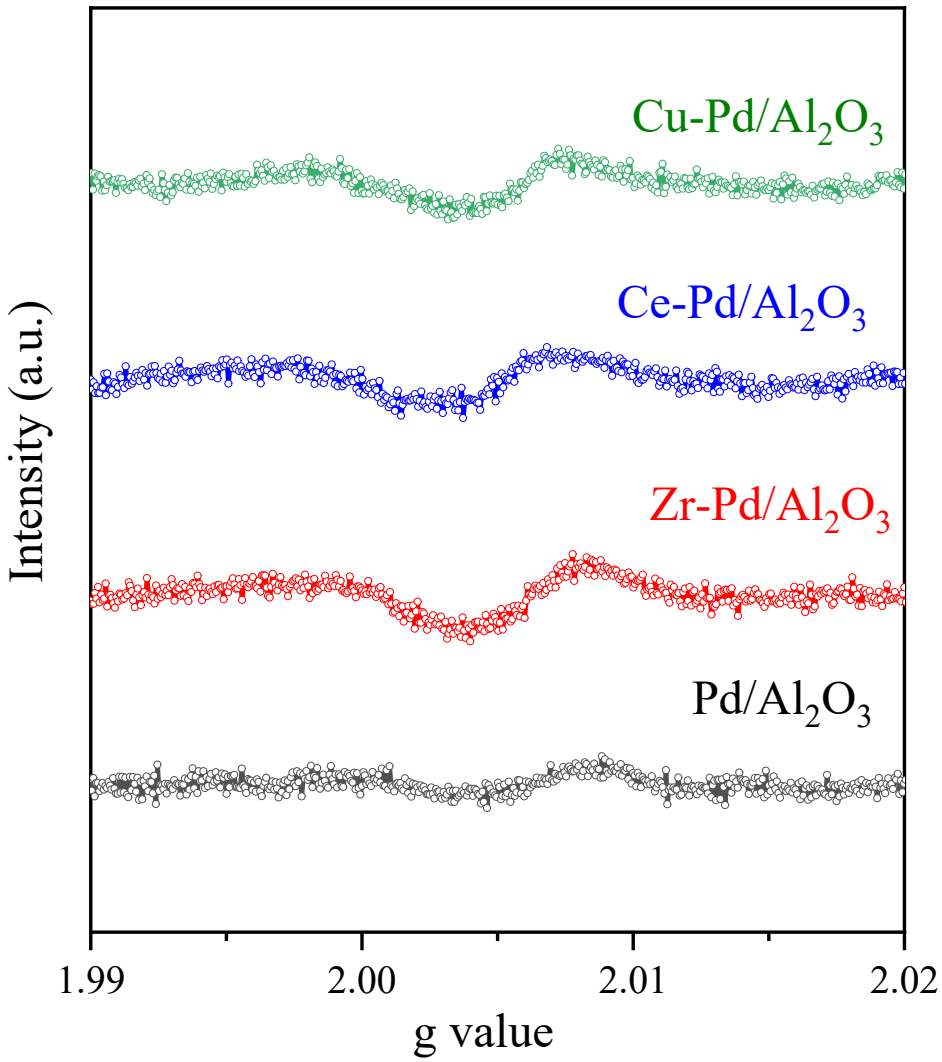

Fig. S4 EPR spectra recorded for the fresh Pd-based catalysts.

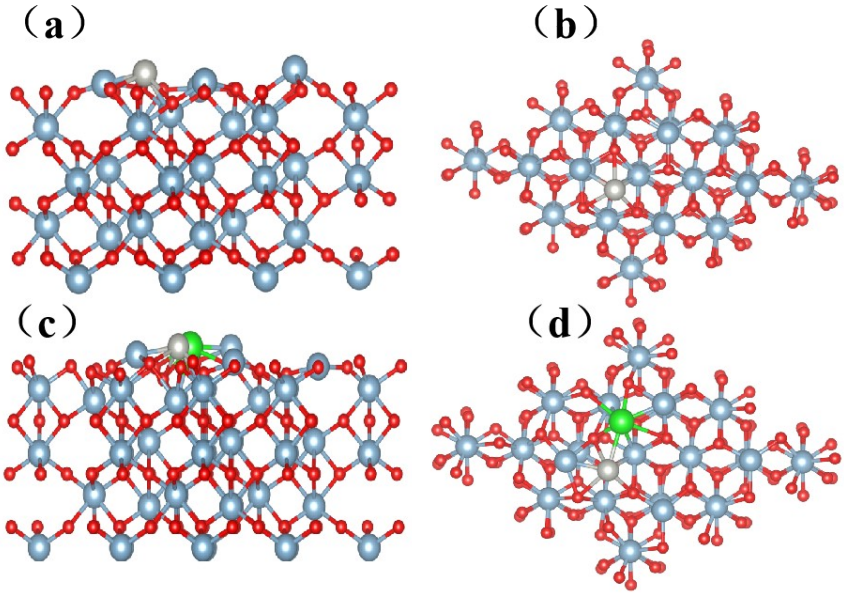

Fig. S5 The model of Pd/Al_2O_3: (a) Side view; (b) Top view. The model of $Zr\text{-}Pd/Al_2O_3$: (c) Side view; (d) Top view.

Table S1. TOF of Pd-based catalysts.

Catalysts	TOF (s^{-1})
Pd/Al_2O_3	0.0158
$Zr\text{-}Pd/Al_2O_3$	0.0164
$Ce\text{-}Pd/Al_2O_3$	0.0160
$Cu\text{-}Pd/Al_2O_3$	0.0157