

Supplementary Information

Towards understanding the improved stability of palladium supported on TS-1 in catalytic combustion

Adi Setiawan,^{a,b} Jarrod Friggieri,^a Eric M. Kennedy,^a Bogdan Z. Dlugogorski,^c Adesoji A. Adesina,^d and Michael Stockenhuber^{a*}

^a Priority Research Centre for Energy (PRCfE), Discipline of Chemical Engineering, School of Engineering, the University of Newcastle, Callaghan, NSW 2308, Australia.

^b Jurusan Teknik Mesin, Fakultas Teknik, Universitas Malikussaleh, Reuleut, Aceh Utara 24355, Indonesia.

^c School of Engineering and Information Technology, Murdoch University, Murdoch, WA 6150, Australia

^d ATODATECH LLC, Brentwood, CA 94513, USA.

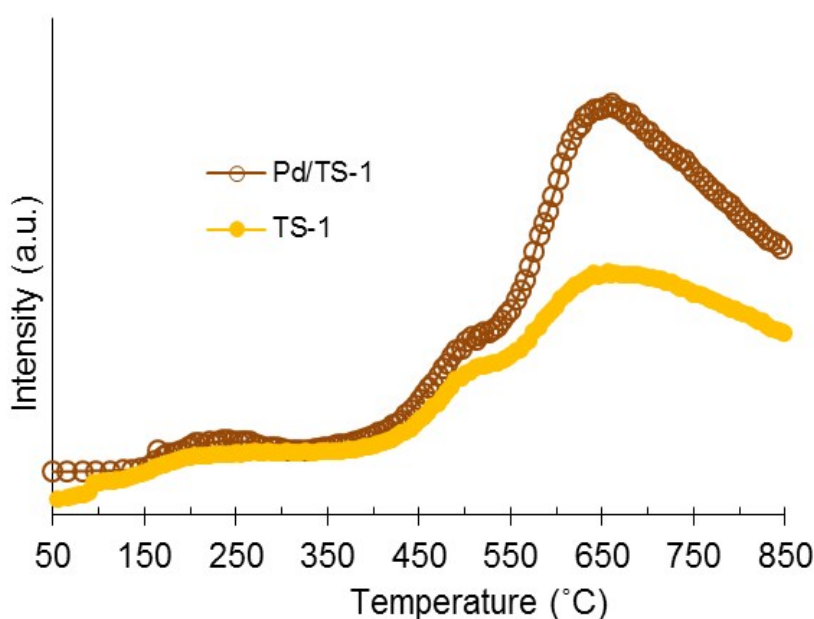


Fig. S1. TPD curves of water desorption from Pd/TS-1 catalyst and catalyst support (TS-1). H₂O was adsorbed at 110 °C. Heating ramp = 5 °C·min⁻¹. ○ = Pd/TS-1; ● = TS-1.

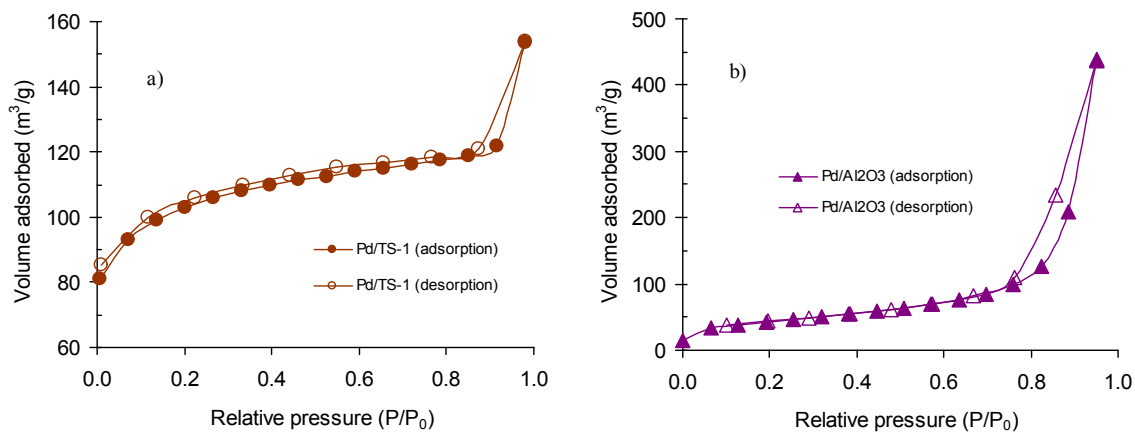


Fig. S2. Nitrogen-isotherm adsorption plot of Pd/TS-1 (a) and Pd/Al₂O₃ catalysts (b). ● = N₂-adsorption on Pd/TS-1; ○ = N₂-desorption from Pd/TS-1; ▲ = N₂-adsorption on Pd/Al₂O₃; △ = N₂-desorption from Pd/Al₂O₃.

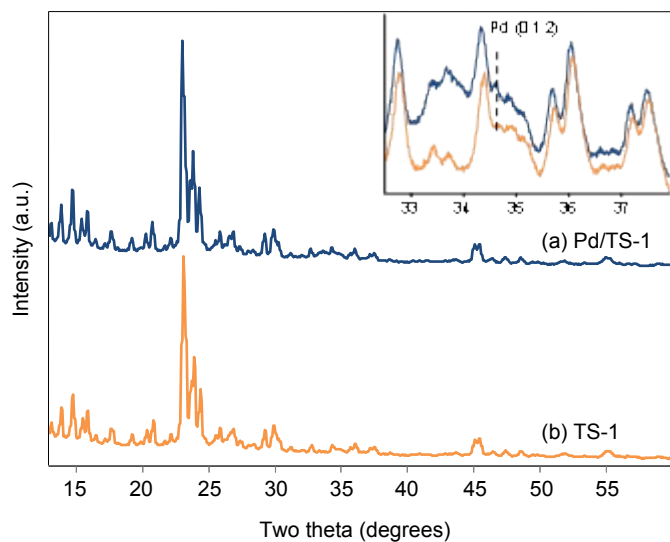


Fig. S3. X-ray diffraction patterns of (a) Pd/TS-1 catalyst and (b) TS-1 zeolite.

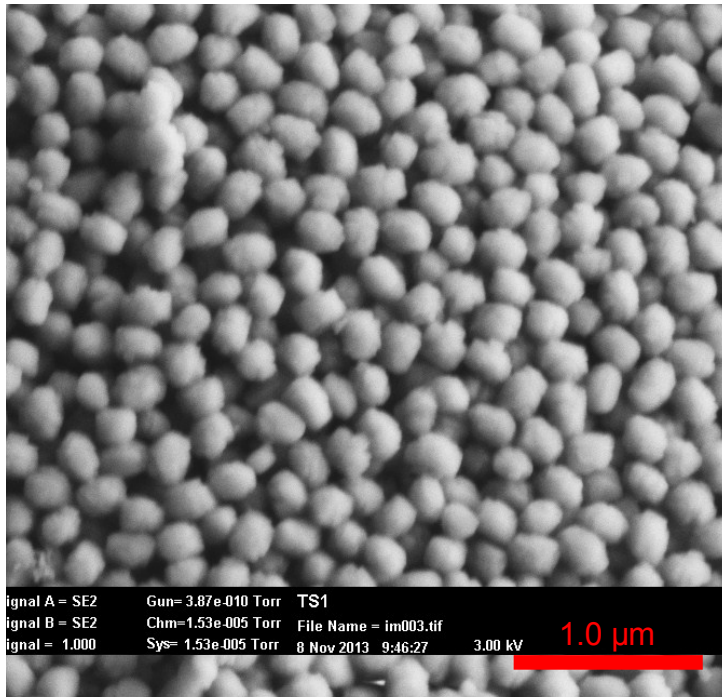


Fig. S4. SEM images of TS-1 zeolite captured by secondary electron detector.

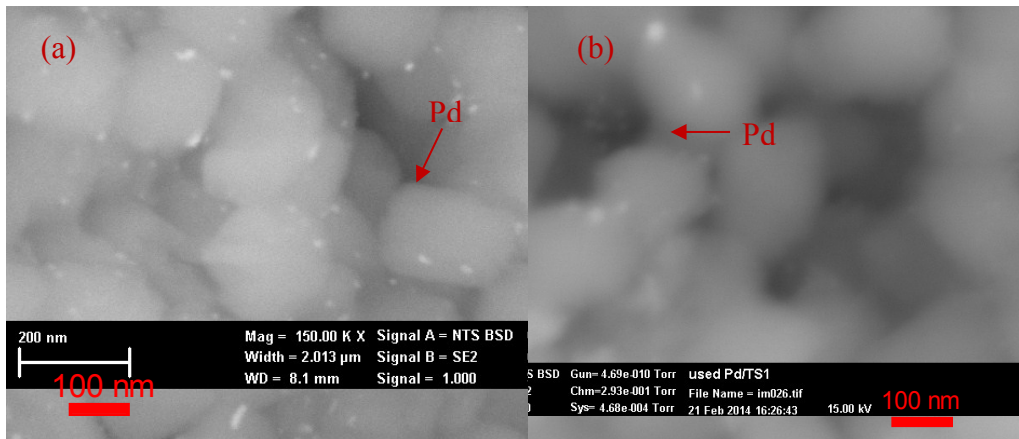


Fig. S5. SEM images of (a) fresh Pd/TS-1 and (b) used Pd/TS-1.

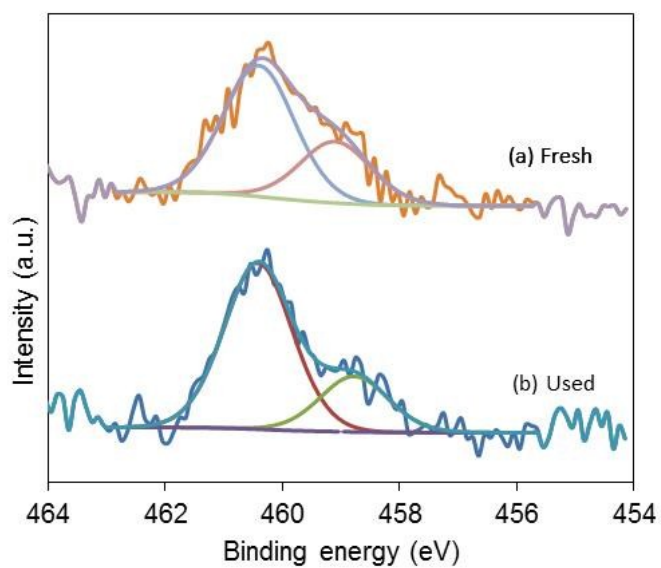


Fig. S6. XPS spectra of Ti 2p core level of Pd/TS-1 fresh (a) and used (b) catalysts

Table S1. Binding energies of Ti 2p core level

Sample	Ti 2p peak position (eV)	
	Peak 1	Peak 2
(a) Pd/TS-1, fresh	460.4	459.1
(b) Pd/TS-1, used	460.4	458.8