Electronic Supplementary Material (ESI) for Catalysis Science & Technology.

SUPPORTING INFORMATION

The selective oxidation of n-butanol to butyraldehyde by oxygen using stable Pt-based nanoparticulate catalysts: An efficient route for upgrading aqueous biobutanol

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Table S2. Pt content of fresh catalysts and of the same catalysts after being stirred during 16 h in aqueous solutions with different concentrations of butyric acid.
The metal content of catalysts was determined using an Agilent 4100 MP-AES. Catalysts were digested for 16 h in 10 mL of *aqua regia* and then diluted to 100 mL with deionized water. The Pt content was analysed using two emission lines at 265.95 and 299.79 nm. The samples were introduced to the nitrogen plasma using a single pass spray chamber at a pressure of 120 kPa without air injection. The instrument was calibrated with 2.5 ppm, 5 ppm, and 10 ppm Au, Pt and Pd standards in 10% *aqua regia* along with a 10% *aqua regia* blank. The samples were read three times and the average result is reported.

Figure S1. Representative TEM images of a Pt cluster (a) and large metal nanoparticles (b) observed in the Pt/C^{CVI_RED400} catalyst.

Figure S2. TEM images and associated PSDs of a) $Pt/CeO_2^{SOL\_PVA\_Red400}$ and b) $Pt/CeO_2^{CVI\_Red400}$.

Catalyst	Theoretical		Fresh		Used	
	Pt (%)	Pd (%)	Pt (%)	Pd (%)	Pt (%)	Pd (%)
$Pt/TiO_2^{SOL\_PVA}$	1	-	0.35	-	0.18	-
$Pt\text{-}Pd(2:1)/TiO_2^{SOL\_PVA}$	0.79	0.21	0.50	0.19	0.32	0.18
$Pt\text{-}Pd(1:1)/TiO_2^{SOL\_PVA}$	0.64	0.36	0.57	0.33	0.43	0.32
$Pt\text{-}Pd(1:2)/TiO_2^{SOL\_PVA}$	0.52	0.48	0.47	0.45	0.35	0.43
$Pd/TiO_2^{SOL\_PVA}$	-	1	-	0.91	-	0.91

Table S1. Pt and Pd metal content determined by ICP-AES of fresh and used monometallic and bimetallic Pt and Pd catalysts prepared by sol immobilization using PVA as the stabilizing agent.

Catalyst	Conditions	Time (h)	Pt Content Fresh (%)	Pt Content. Used (%)	Leaching (%)
$Pt/TiO_2^{Sol\text{-}PVA}$	10 mL water	16	0.35	0.33	5.7
$Pt/TiO_2^{CVI\_PVA}$	10 mL 0.07M butyric acid in water	16	0.35	0.21	40.0
$Pt/TiO_2^{Sol\_PVA}$	10 mL 0.5M butyric acid in water	16	0.35	0.22	37.1
$Pt/TiO_2^{Sol\_PVA\_Red400}$	10 mL water	16	0.35	0.34	2.9
$Pt/TiO_2^{Sol\_PVA\_Red400}$	10 mL 0.07M butyric acid in water	16	0.35	0.24	31.4
$Pt/TiO_2^{Sol\_PVA\_Red400}$	10 mL 0.5M butyric acid in water	16	0.35	0.23	34.3
$Pt/TiO_2^{CVI\_Red400}$	10 mL water	16	0.87	0.88	0.0
$Pt/TiO_2^{CVI\_Red400}$	10 mL 0.07M butyric acid in water	16	0.87	0.40	54.0
$Pt/TiO_2^{CVI\_Red400}$	10 mL 0.5M butyric acid in water	16	0.87	0.41	52.9

Table S2. Pt content of fresh catalysts and of the same catalysts after being stirred during 16 h in aqueous solutions with different concentrations of butyric acid.

The metal content of catalysts was determined using an Agilent 4100 MP-AES. Catalysts were digested for 16 h in 10 mL of *aqua regia* and then diluted to 100 mL with deionized water. The Pt content was analysed using two emission lines at 265.95 and 299.79 nm. The samples were introduced to the nitrogen plasma using a single pass spray chamber at a pressure of 120 kPa without air injection. The instrument was calibrated with 2.5 ppm, 5 ppm, and 10 ppm Au, Pt and Pd standards in 10% *aqua regia* along with a 10% *aqua regia* blank. The samples were read three times and the average result is reported.

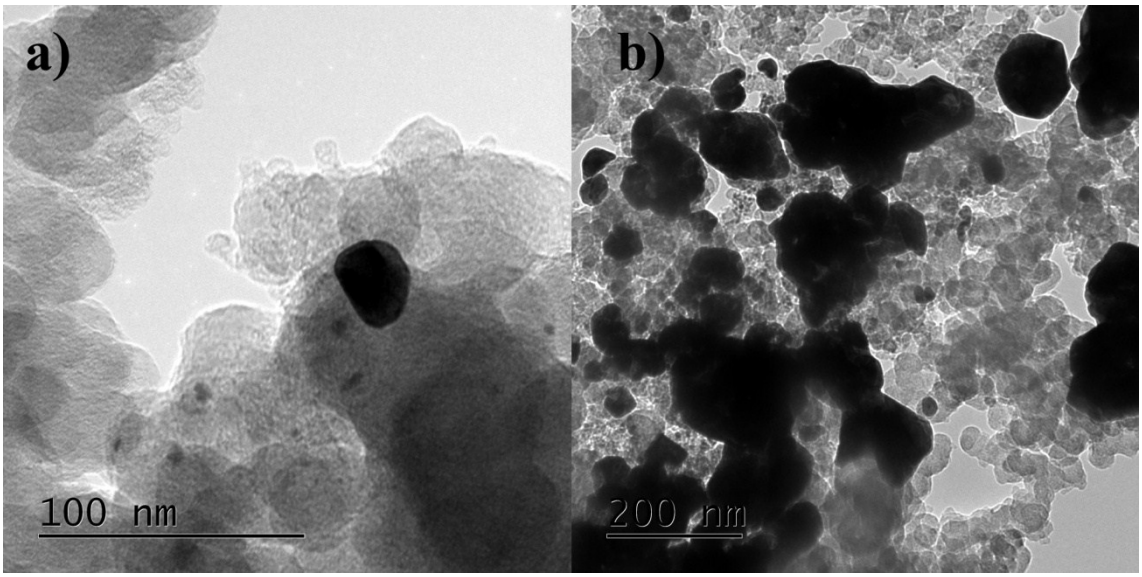

Figure S1. Representative TEM images of a Pt cluster (a) and large metal nanoparticles (b) observed in the Pt/C^{CVI_RED400} catalyst.

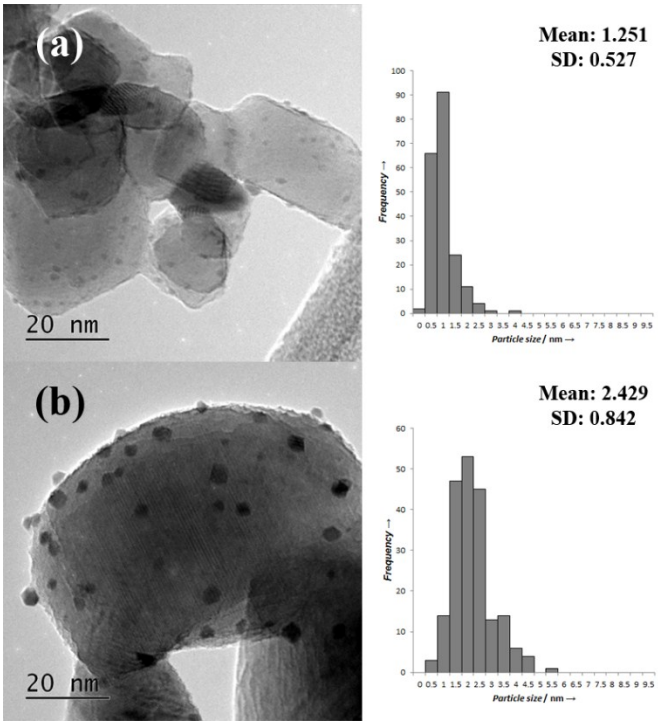

Figure S2. TEM images and associated PSDs of a) $Pt/CeO_2^{SOL\_PVA\_Red400}$ and b) $Pt/CeO_2^{CVI\_Red400}$.