

-Supplementary material-

Temperature-dependent activity of gold nano-catalysts supported on activated carbon in redox catalytic reactions: 5-hydroxymethylfurfural oxidation and 4-nitrophenol reduction comparison

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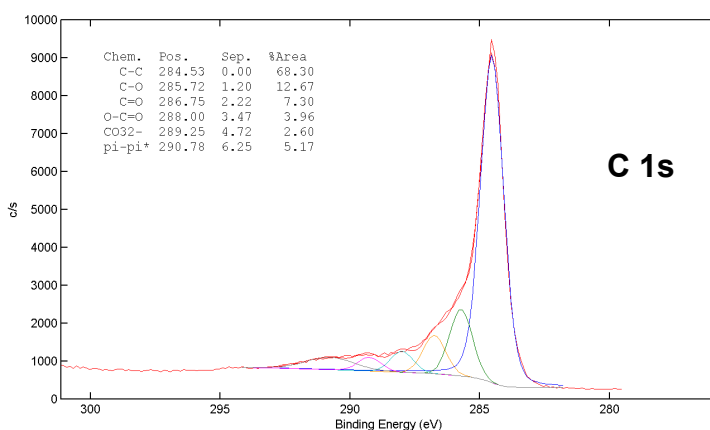
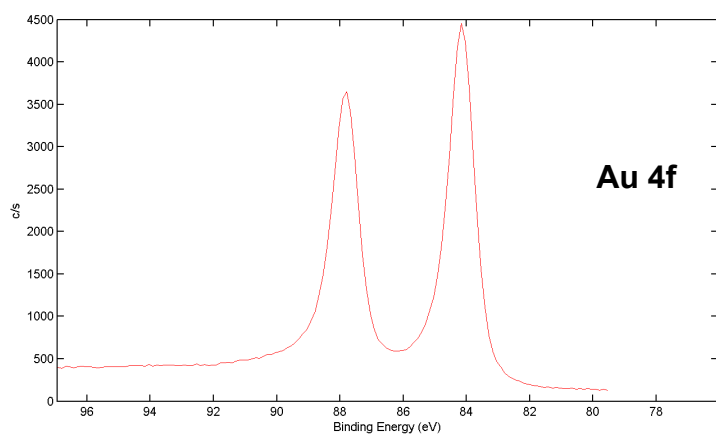
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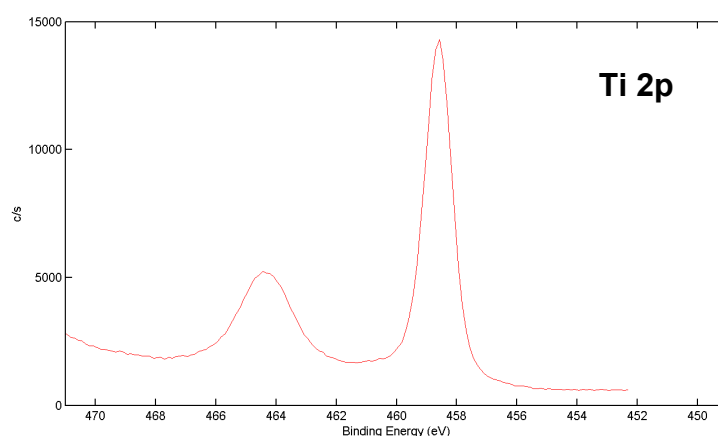
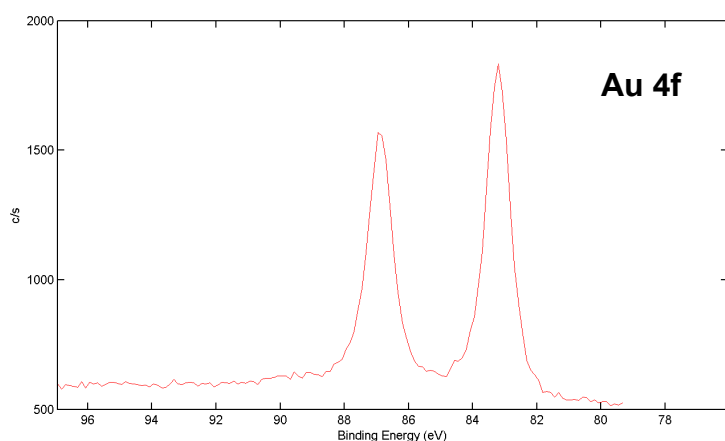
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X-ray photoelectron spectroscopy (XPS)

a)



b)



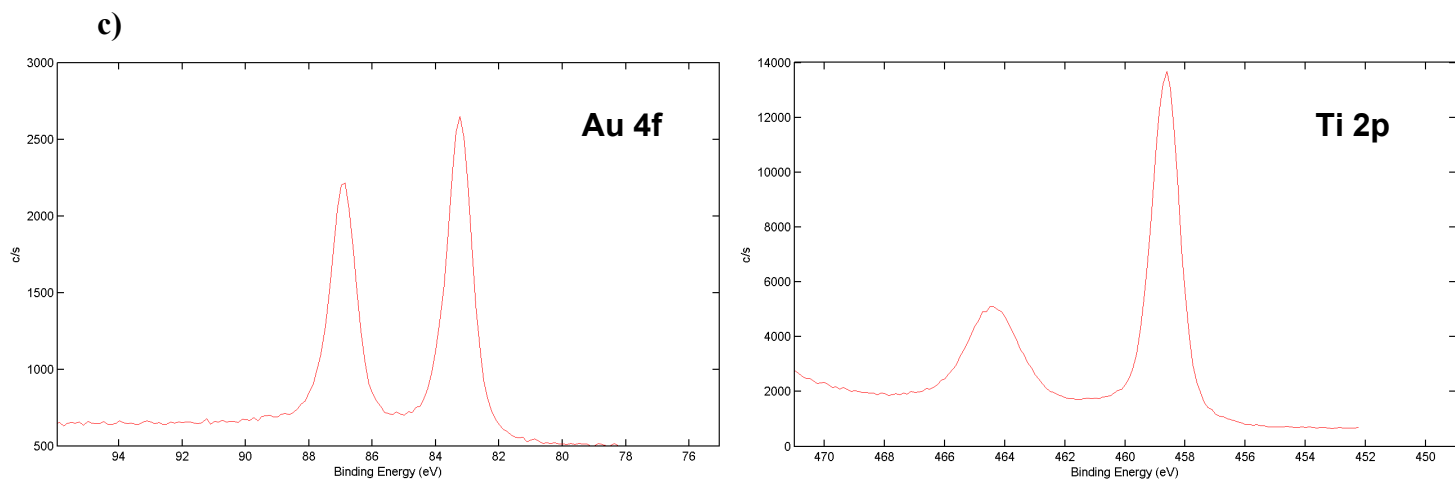


Figure S1. XPS spectra for Au/AC_PVA-99-washed (a), Au/TiO₂_PVA-99 (b) and Au/TiO₂_PVA-99-washed (c).

Transmission Electron Microscopy

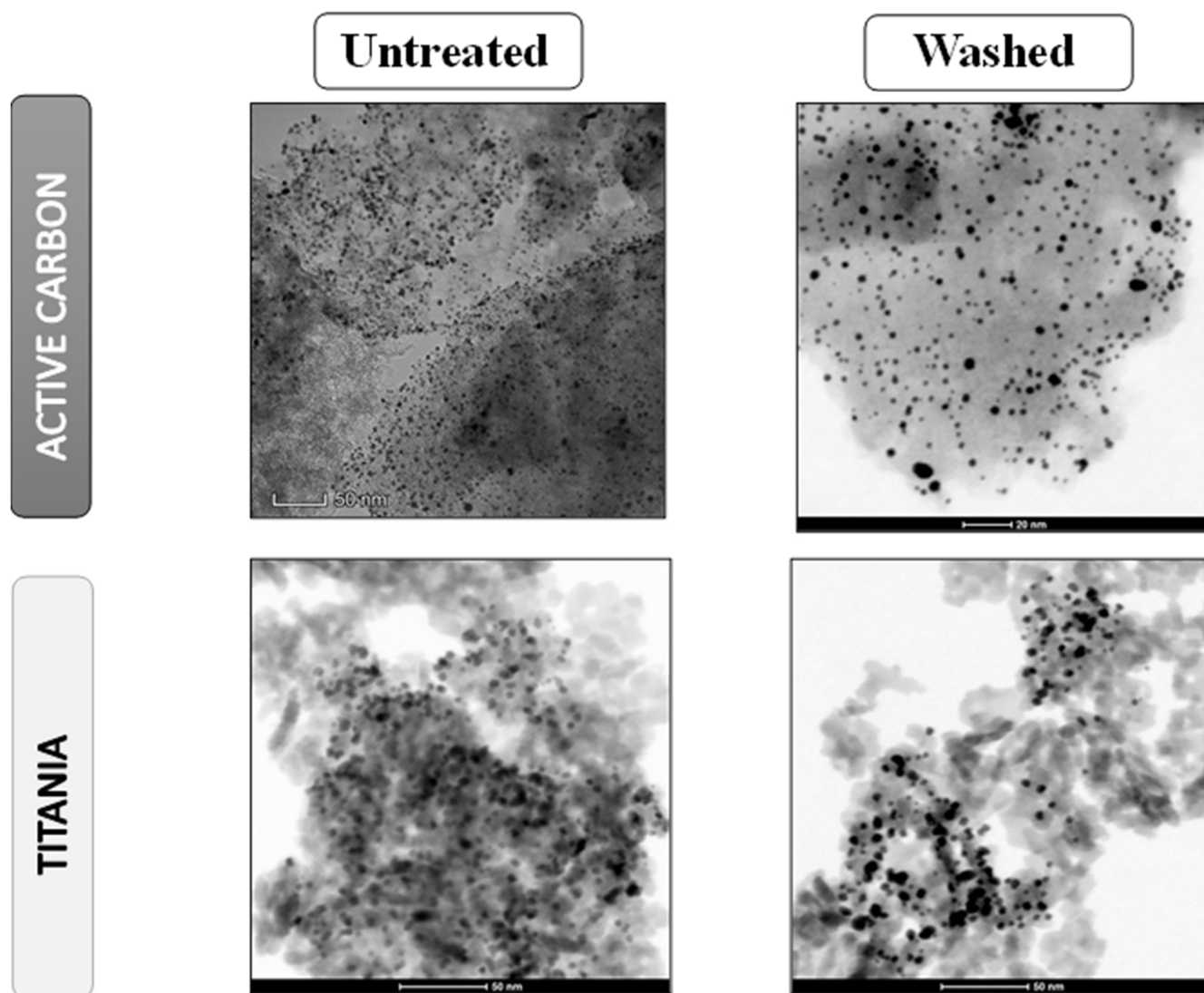


Figure S2. TEM images of treated and untreated catalysts supported on active carbon and titania.

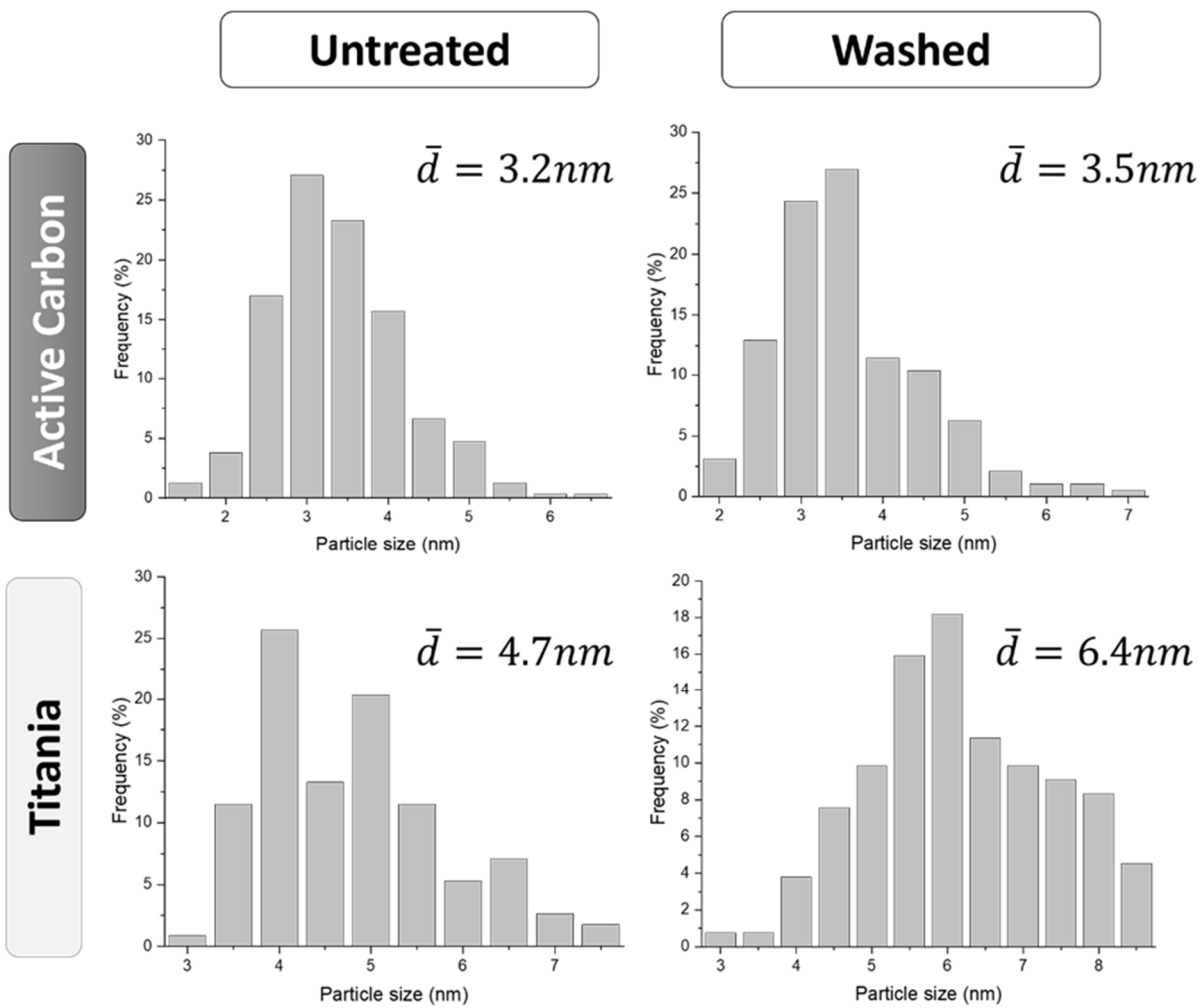


Figure S3. Particles size distribution of treated and untreated catalysts supported on active carbon and titania.

Table S1. Catalytic results on the HMF oxidation reaction.Reaction conditions: T=70 °C, t=4h, P=10 bar O₂, molar ratios HMF: Au: NaOH=1:0.01:4.

Sample	PVA HD (%)	X HMF (%)	S HMFCFA (%)	S FFCA (%)	S FDCA (%)
Au/AC_PVA-20	20	100	48	1	51
Au/AC_PVA-40	40	100	29	0	71
Au/AC_PVA-50	50	100	20	0	80
Au/AC_PVA-60	60	100	25	0	75
Au/AC_PVA-88	88	100	32	0	68
Au/AC_PVA-99	99	100	31	0	69

Table S2. Kinetic parameters (apparent rate constant and conversion) for the 4-nitrophenol reduction related to catalysts prepared using PVA with different hydrolysis degree.

Sample	PVA (%)	HD	TEM Ø (nm)	Surface (at%)	Au	k _{app} (min ⁻¹)	X%
Au/AC_PVA-20	20		9.6	0.86		1.4·10 ⁻³ ±2·10 ⁻⁴	14±1
Au/AC_PVA-40	40		4.3	1.33		6.3·10 ⁻² ±9·10 ⁻³	97±1
Au/AC_PVA-50	50		4.2	1.72		0.1±4·10 ⁻³	99±0.4
Au/AC_PVA-60	60		3.9	3.34		0.2±4·10 ⁻²	99±1
Au/AC_PVA-88	88		3.4	2.04		7.9·10 ⁻² ±1·10 ⁻³	97±1
Au/AC_PVA-99	99		3.2	1.47		1.8·10 ⁻³ ±4·10 ⁻⁴	16±0.2