Supplementary Material

Insights into the nature of the active sites of Pt-WO_x/Al_2O_3 catalysts for the glycerol hydrogenolysis into 1,3-propanediol

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1 Figures

Figure S1. Visual identification of bulk WO_3 crystallites (of yellow color) on the 15W/γ-Al_2O_3 material (right). The 10W/γ-Al_2O_3 material (left) is shown for comparison.

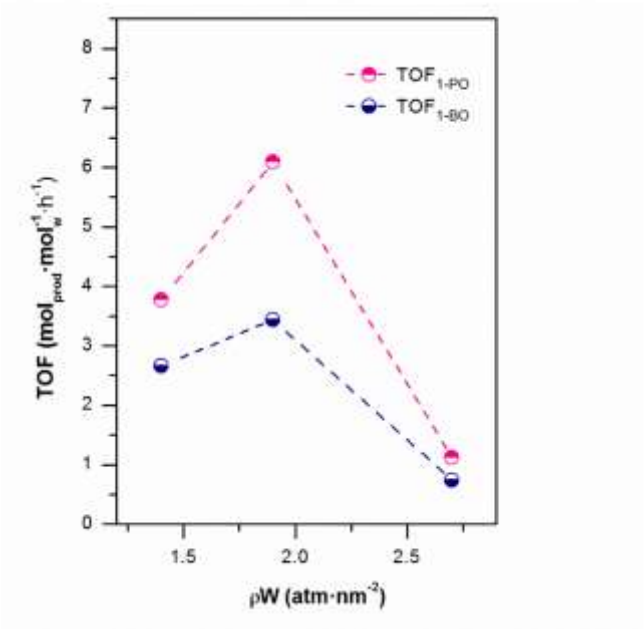

Figure S2. Correlation between $TOF_{product\text{-}W}$ and tungsten surface density for $5Pt^{pH10}\gamma W^*$ catalysts. 1-propanol (1-PO) and 1-butanol (1-BO) are the products obtained after the hydrogenolysis of the secondary hydroxyl group, when 1,2-propanediol (1,2-PDO) or 1,2-butanediol (1,2-BDO) are used as substrate.

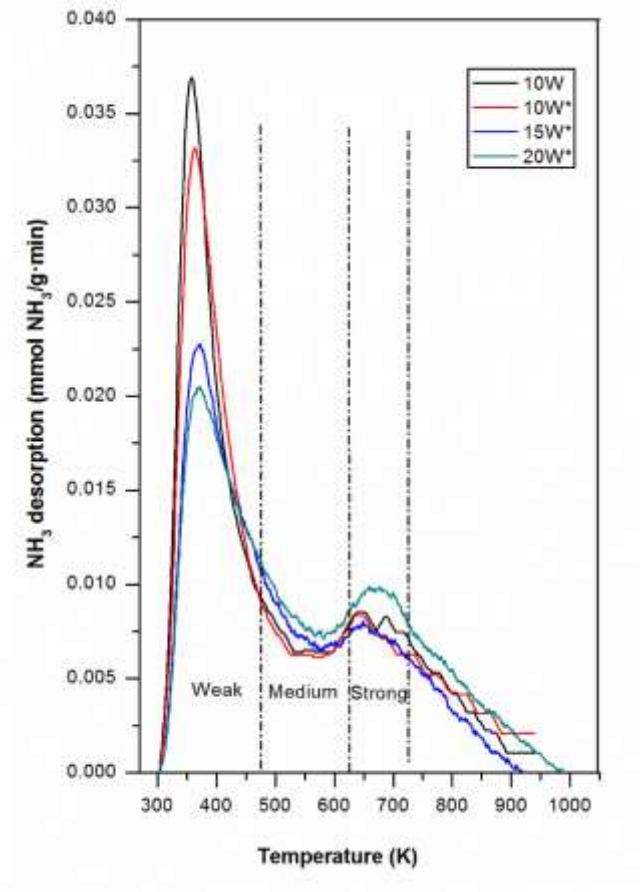

Figure S3. TPD-NH_3 profiles for different tungsten oxide γ-Al_2O_3 materials.

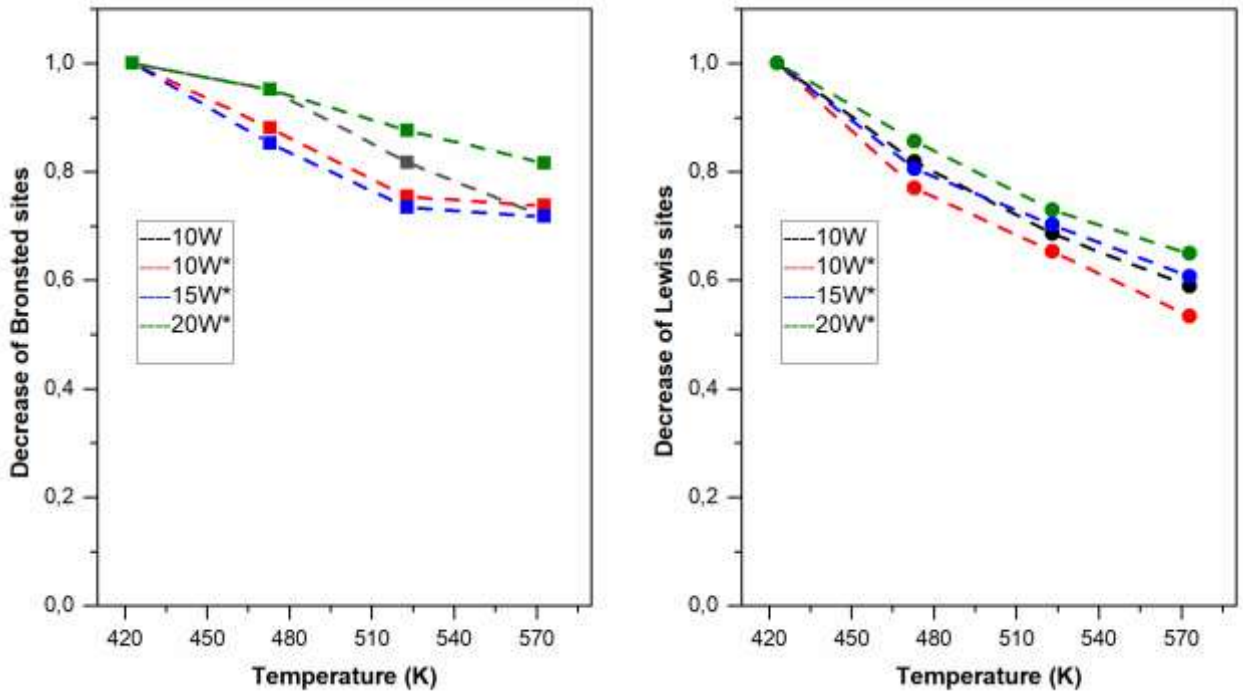

Figure S4. Fraction of Brönsted sites (left) and Lewis sites (right) remaining in the surface of the catalyst as a function of the vacuum treatment temperature.

2 Tables

Table S1. Ratio between the H_2 consumption in peaks related to the PtO reduction (peaks 1,2 and 3 from Figure 1) and the theoretical H_2 consumption to reduce all the PtO present in the catalyst to Pt^0.

Catalyst /γ-Al_2O_3	$\frac{TPR\ H_2\ Consumption}{H_2 Theoretical\ Consumption}$
$5Pt^{pH4}10W$	1.30
$5Pt^{pH6}10W$	1.13
$5Pt^{pH8}10W$	1.79
$5Pt^{pH10}10W$	1.32
$5Pt^{pH10}10W$*	1.05
$5Pt^{pH10}10W$*	0.97
$5Pt^{pH10}10W$*	0.95

Table S2. Total acidity (measured by TPD-NH_3), and Brønsted to Lewis ratio (measured by FTIR of adsorbed pyridine after vacuum treatment at different temperatures) of supported tungsten oxide materials.

Material /γ-Al_2O_3	TPD-NH_3 (mmol NH_3/g)				FTIR Pyridine Brønsted/Lewis (B/L) ratio			
	Total acidity	weak (353-473 K)	medium (473-623 K)	strong (623-723K)	423 (K)	473 (K)	523 (K)	573 (K)
10W	1.046	0.674	0.209	0.162	0.043	0.050	0.051	0.052
10W*	1.007	0.657	0.202	0.148	0.058	0.078	0.102	0.130
15W*	0.874	0.513	0.220	0.141	0.078	0.082	0.081	0.092
20W*	0.922	0.485	0.254	0.184	0.246	0.274	0.294	0.310

Table S3. Textural properties and tungsten surface density of different supported tungsten oxide materials.

Material /γ-Al_2O_3	S_{BET} (m^2/g)	V_{pore} (cm^3/g)	ρW ($at_W \cdot nm^{-2}$)
10W	216	0.63	1.28
10W*	212	0.60	1.39
15W*	214	0.59	1.93
20W*	176	0.50	2.71