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Table S1 Data for oxidation of p-toluenesulfonic acid

Time (min)/ Compound	alkane 1	alcohol 2	aldehyde 3
0	0.4	0	0
15	0.391	0.01	0
30	0.38	0.021	0
60	0.36	0.04	0
90	0.333	0.067	0.006
120	0.305	0.092	0.009
180	0.252	0.130	0.021
260	0.238	0.10	0.040

Table S2. Oxidation of ethanol under standard conditions.^a

Compound/Time (min)	50 [C] (M)	80 [C] (M)	110 [C] (M)	140 [C] (M)	170 [C] (M)
ethanol [$]_0 = 0.3$ M	0.26	0.19	0.16	0.11	0.10
1,2-ethanediol	0.010	0.010	0.009	0.008	0.008
1-chloroethan-2-ol	0.005	0.013	0.014	0.016	0.016
Pt-ethene complex	0.008	0.017	0.025	0.061	0.012
chloroacetaldehyde	0.015	0.030	0.012	0.012	0.004
glyoxal	0.001	0.008	0.036	0.072	0.064
acetic acid	-	-	-	0.005	0.010
glycolic acid	-	-	-	0.003	0.005
glyoxalic acid	-	-	-	0.001	<0.001
chloroacetic acid	-	-	-	-	<0.001

^a: determined by ¹³C NMR

Table S3. Oxidation of 1-propanol under standard conditions.

Compound/Time (min)	15 [C] (M)	30 [C] (M)	45 [C] (M)	60 [C] (M)	75 [C] (M)
1-propanol $[I]_0 = 0.3 \text{ M}^a$	0.295	0.26	0.185	0.16	0.16
1-chloropropan-3-ol ^b	-	0.004	0.011	0.011	0.014
1,3-propanediol ^b	-	0.003	0.011	0.007	0.011
Pt-propene complex ^a	0.0005	0.005	0.025	0.018	0.015
acetone ^c	-	0.002	0.005	0.006	0.007
1-propanal ^c	-	0.008	0.016	0.019	0.017

a: by NMR and GC. b: by NMR. c: by GC

Table S4. Oxidation of 2-propanol under standard conditions.

Compound/ Time (min)	35 (M)	60 (M)	85 (M)	110 (M)	125 (M)
2-propanol $[I]_0 = 0.3 \text{ M}$	0.27	0.22	0.20	0.13	0.08
acetone	0.024	0.067	0.072	0.12	0.16
Pt-propene complex	-	0.007	0.013	0.016	-

Table S5. ^1H NMR Data for p-Toluenesulfonic Acid and Oxidation Products.

Compound	sidechain, d	aromatic, d	J_{HH} (Hz)
$\text{CH}_3\text{C}_6\text{H}_4\text{SO}_3\text{H}$ (1)	1.81	7.10, 7.43	8
$\text{HOCH}_2\text{C}_6\text{H}_4\text{SO}_3\text{H}$ (2)	4.13	7.25, 7.55	8
$\text{ClCH}_2\text{C}_6\text{H}_4\text{SO}_3\text{H}$ (4)	4.18	7.30, 7.60	8
$\text{CHOC}_6\text{H}_4\text{SO}_3\text{H}$ (3)	9.73	7.72, 7.79	8.5
$\text{CO}_2\text{HC}_6\text{H}_4\text{SO}_3\text{H}$ (5)	-----	6.92, 7.03	8

Table S6. ^1H NMR Data for p-Ethylbenzenesulfonate and Oxidation Products

Compound a b	proton	d	multiplicity (all $^3J_{\text{HH}} \approx 7$ Hz)
$-\text{O}_3\text{SC}_6\text{H}_4\text{CH}_2\text{CH}_3$	a	0.89	t
	b	2.36	q
$-\text{O}_3\text{SC}_6\text{H}_4\text{CH}(\text{OH})\text{CH}_3$ (8)	a	1.18	d
	b	2.72	q
$-\text{O}_3\text{SC}_6\text{H}_4\text{CH}_2\text{CH}_2\text{OH}$ (9)	a	2.59	t
	b	3.56	t
$-\text{O}_3\text{SC}_6\text{H}_4\text{CH}_2\text{CH}_2\text{Cl}$ (10)	a	2.83	t
	b	3.54	t
$-\text{O}_3\text{SC}_6\text{H}_3\text{XCH}_2\text{CH}_3$ (11)	a	0.92	t
	b	2.38	q

Table S7. ^{13}C NMR resonances of ethanol oxidation products

Compound	C1	C2
ethanol $\text{CH}_3\text{CH}_2\text{OH}$	60.3	20.8 (37)
ethylene glycol $\text{CH}_2\text{OHCH}_2\text{OH}$	67.1	
2-chloroethanol $\text{CH}_2\text{OHCH}_2\text{Cl}$	67	50.9 (39)
Zeise's salt $\text{Pt}(\text{C}_2\text{H}_4)\text{Cl}_3^-$	75.6	
glycolic acid $\text{CH}_2\text{OHCHO}_2\text{H}$	181.1	62.1(59)
chloroacetaldehyde $\text{CH}(\text{OH})_2\text{CH}_2\text{Cl}$	91.5	48.9 (47)
glyoxal $\text{CH}(\text{OH})_2\text{CH}(\text{OH})_2$	93.1 ^a	
oxy acetic acid $\text{CH}(\text{OH})_2\text{C}(\text{O})_2\text{H}$	175.9	89.3 (70)
acetic acid CO_2HCH_3	179.6	22.3 ^a (68)
chloroacetic acid $\text{CO}_2\text{HCH}_2\text{Cl}$	174.6	42.3 ^a (60)

Referenced to $\text{HO}_3\text{SC}_6\text{H}_4\text{COOH}$ ($d = 133.1$ and 128.6 ppm for C-H). Not present in the mixture are compounds containing $\text{C}(\text{OH})(\text{Cl})$ or $\text{C}(\text{O})\text{Cl}$ groups. These are not likely to be stable towards hydrolysis. Also oxalic acid and glycolaldehyde $\text{CH}_2\text{OHCH}(\text{OH})_2$ were not observed. They rapidly decompose under reaction conditions. $^1\text{J}(\text{C}-\text{C})$ in parentheses. ^a H/D exchange in this position.

Table S8. ^1H NMR resonances of ethanol oxidation products

Compound	H1	H2
ethanol $\text{CH}_3\text{CH}_2\text{OH}$	1.20 (q)	3.65 (t, 7 Hz)
ethylene glycol $\text{CH}_2\text{OHCH}_2\text{OH}$	3.68 (s)	
2-chloroethanol $\text{CH}_2\text{OHCH}_2\text{Cl}$	3.7 (ps. t)	3.75 (ps.t, 8 Hz)
Zeise's salt $\text{Pt}(\text{C}_2\text{H}_4)\text{Cl}_3^-$	4.85 (s)	
glycolic acid $\text{CH}_2\text{OHCHO}_2\text{H}$	4.17 (s)	
chloroacetaldehyde $\text{CH}(\text{OH})_2\text{CH}_2\text{Cl}$	5.2 (s, b)	3.57 (s, b)
glyoxal $\text{CH}(\text{OH})_2\text{CH}(\text{OH})_2$	a	
oxy acetic acid $\text{CH}(\text{OH})_2\text{C}(\text{O})_2\text{H}$	a	
acetic acid CO_2HCH_3	2.01 (s)	
chloroacetic acid $\text{CO}_2\text{HCH}_2\text{Cl}$	4.23 (s)	

Referenced to $\text{HO}_3\text{SC}_6\text{H}_4\text{COOH}$ ($\delta = 8.09$ and 7.9 ppm for C-H). All shifts given are sensitive to concentration and [Pt salts] and therefore to be taken as indications rather than absolute values. a: not assigned

Table S9. ^{195}Pt NMR Data^a

Chemical shift (rel. to K_2PtCl_6)	Assignment
-1620	PtCl_4^{2-}
-1190	$\text{PtCl}_3(\text{H}_2\text{O})^-$
-850	$\text{PtCl}_2(\text{H}_2\text{O})$
0	PtCl_6^{2-}
440	$\text{PtCl}_5(\text{H}_2\text{O})^-$

a: Cf. Dunham, S. O.; Larsen, R. D.; Abbott, E. H. *Inorg. Chem.* 1991, 30, 4328.