Supporting Information of

"Impact of Hydrogen Peroxide on Carbon Corrosion in Aqueous KOH Solution"

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Table S1. Electrodeposition conditions of the catalysts to HOPGs

Sample name	Condition	Electrolyte solution (35 cm^3)
Pt|HOPG	Galvanostatic deposition Current density: –1.80 mA cm^{-2}, Time: 3.0 s	1 mmol dm^{-3} H_2PtCl_6 + 2.1 mmol dm^{-3} HCl
Ag|HOPG	Galvanostatic deposition Current density: –1.74 mA cm^{-2}, Time: 7.0 s	2.2 mmol dm^{-3} $AgNO_3$
MnO_x|HOPG	Cyclic voltammetry[1,2] Scan range: 0 – 0.40 V vs. Ag|AgCl|Sat'd KCl, Scan rate: 20 mV s^{-1}, Number of cycles: 5	0.1 mol dm^{-3} $Mn(CH_3COOH)_2$ + 0.1 mol dm^{-3} Na_2SO_4
CoO_x|HOPG	Cyclic voltammetry Scan range: 0 – 0.65 V vs. Ag|AgCl|Sat'd KCl, Scan rate: 20 mV s^{-1}, Number of cycles: 5	0.1 mol dm^{-3} $Co(CH_3COOH)_2$ + 0.1 mol dm^{-3} Na_2SO_4

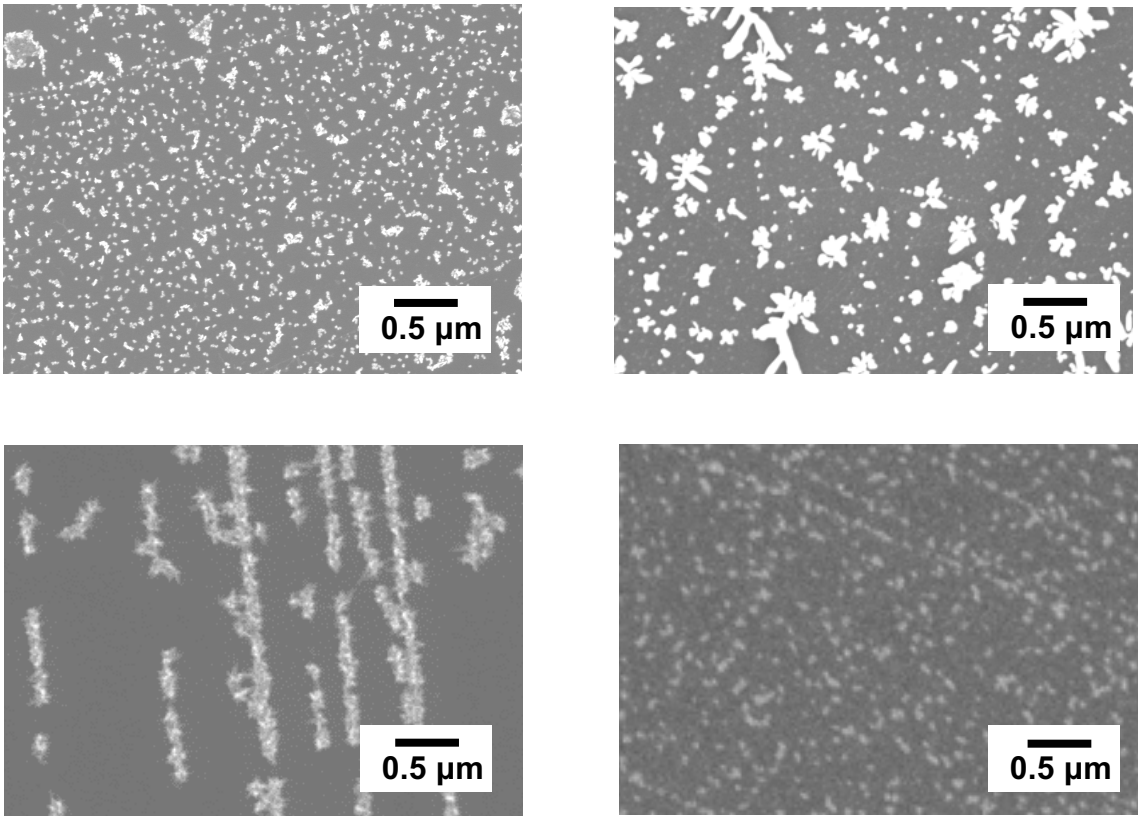

Figure S1. FE-SEM images of the as-prepared (a) Pt|HOPG, (b) Ag|HOPG, (c) MnO_x|HOPG, and CoO_x|HOPG.

Table S2. Coverage rates and mean diameters of the catalyst particles on HOPGs analyzed with ImageJ software[3]

Catalyst	Coverage rate / %	Mean diameter / nm
Pt	17	60
Ag	21	130
MnO_x	14	300
CoO_x	16	100

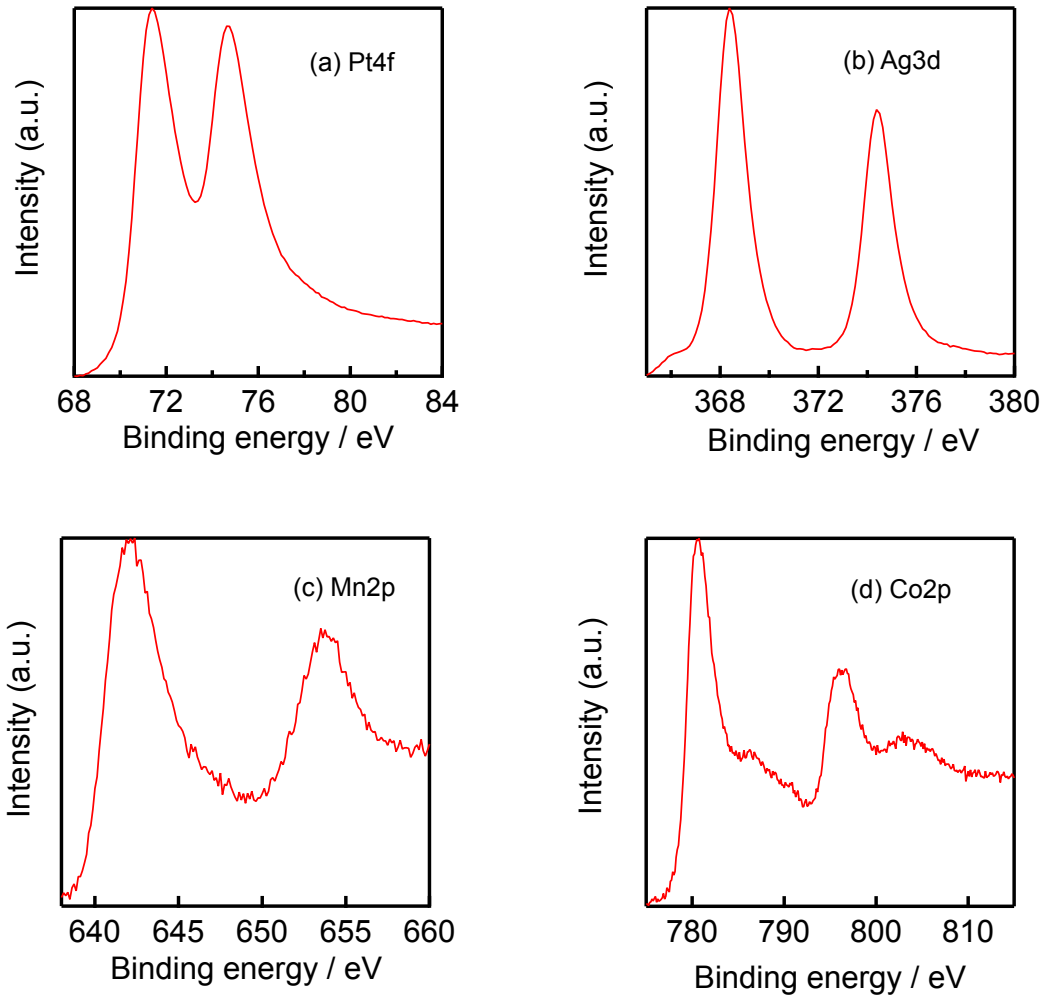

Figure S2. XPS (a) Pt4f, (b) Ag3d, (c) Mn2p, and (d) Co2p spectra of the as-prepared Pt|HOPG, Ag|HOPG, MnO_x|HOPG, and CoO_x|HOPG.

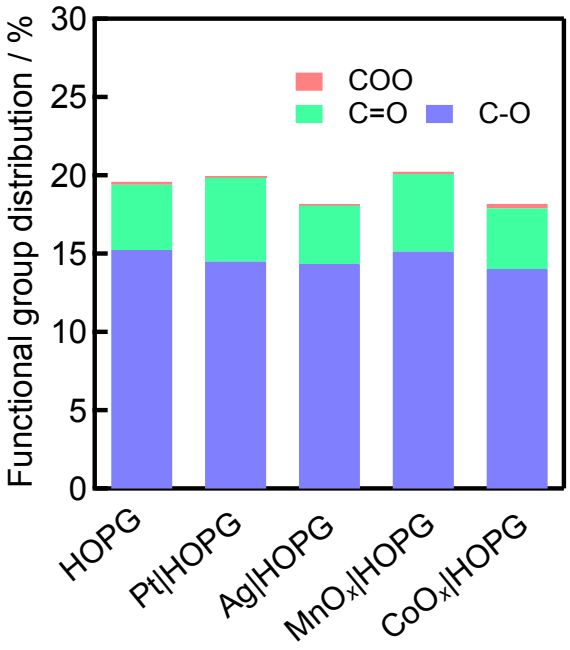

Figure S3. Distribution of oxygen-containing functional groups on the HOPG and catalyst-loaded HOPGs after the immersion test to 1.0 mol dm^{-3} KOH + 5 mmol dm^{-3} H_2O_2 calculated from XPS C1s spectra.

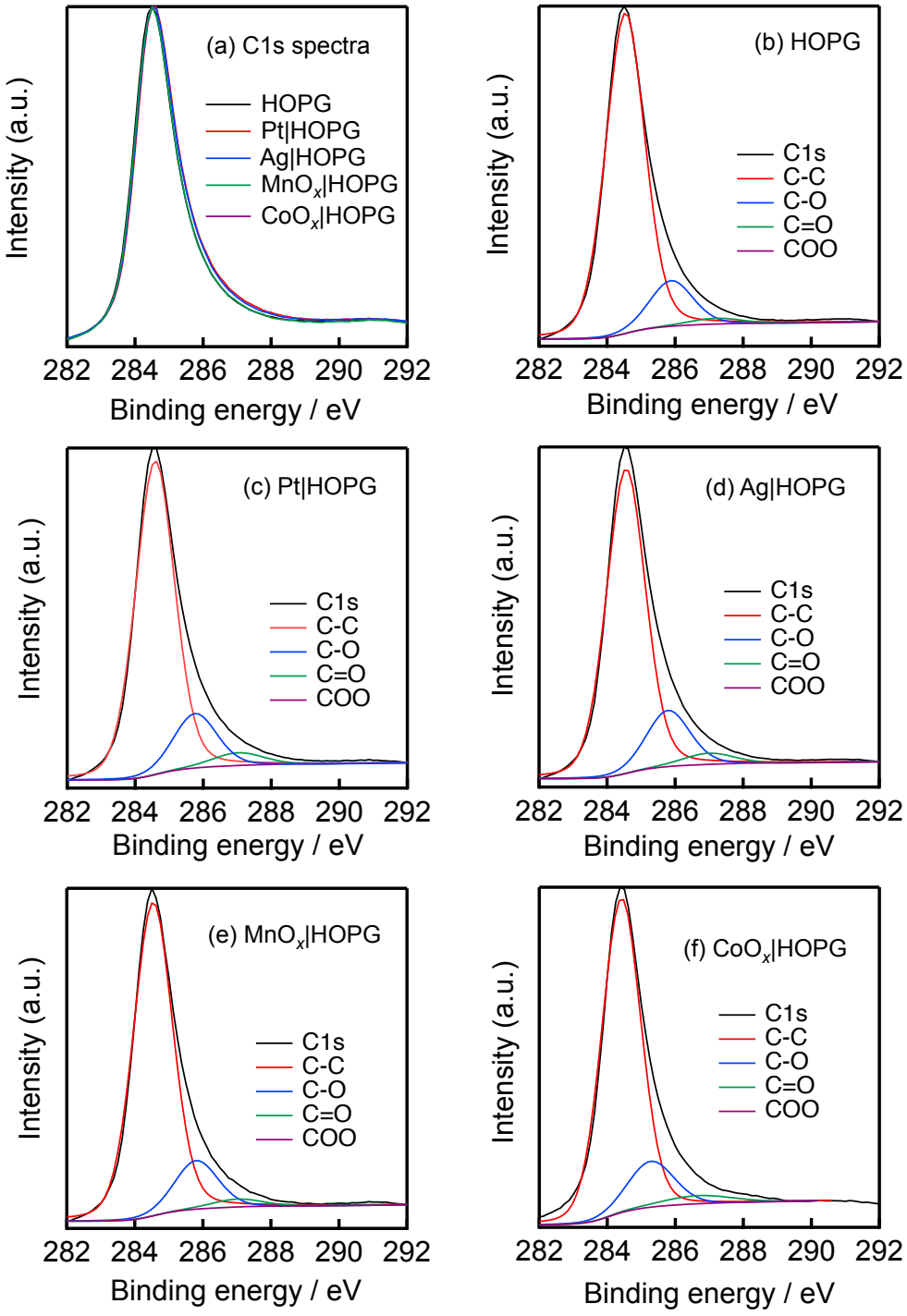

Figure S4. (a) XPS C1s spectra and (b–d) fitting results of the as-prepared HOPG samples.

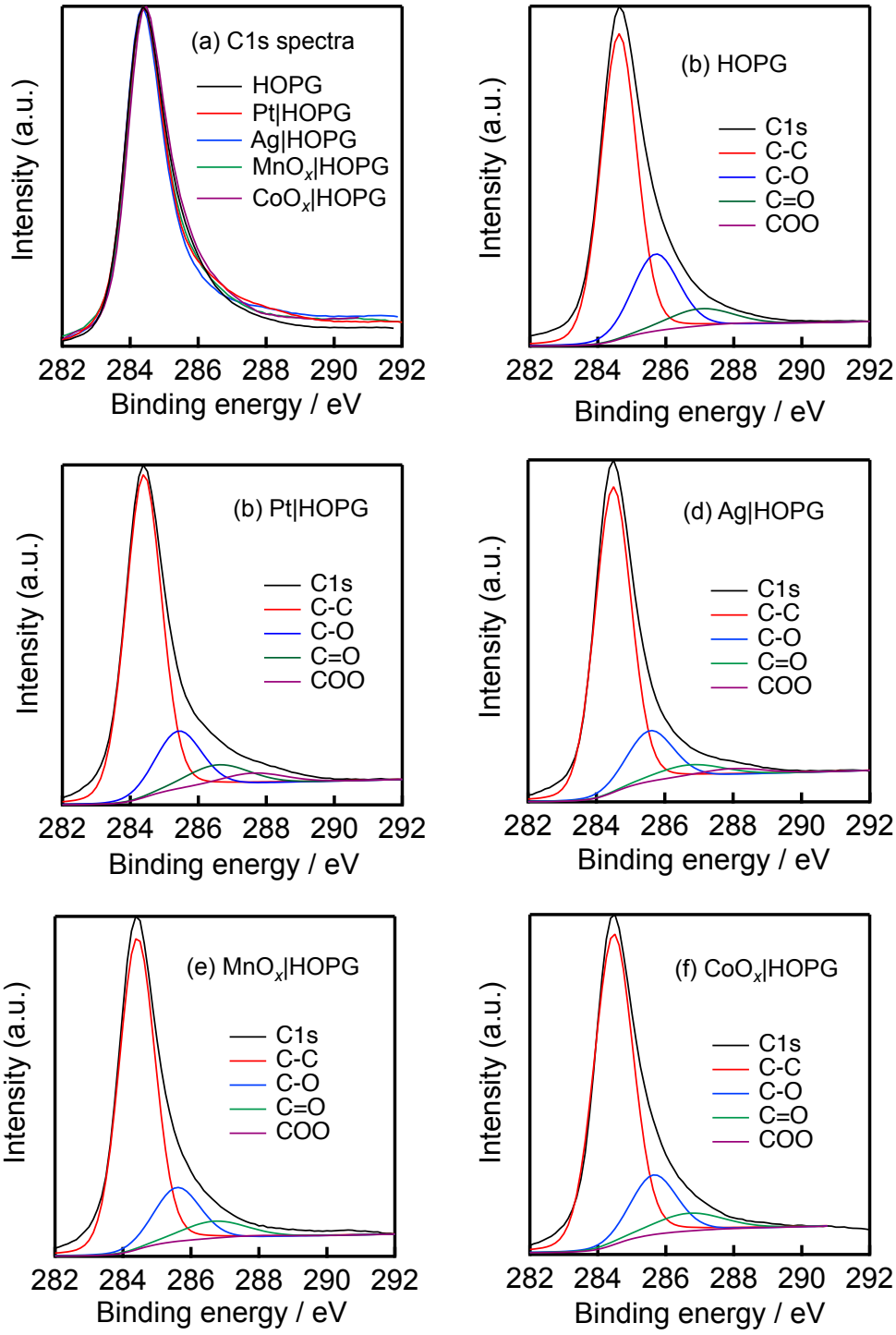

Figure S5. (a) XPS C1s spectra and (b–d) fitting results of the HOPG samples after the immersion test to 1.0 mol dm^{-3} KOH + 5 mmol dm^{-3} H_2O_2.

References

1. M. S. El-Deab and T. Ohsaka, *Angew. Chem. Int. Ed.*, **45,** 5963 (2006).

2. M. S. El-Deab and T. Ohsaka, *J. Electrochem. Soc.*, **155**, D14 (2008).

3. C. A. Schneider, W. S. Rasband, and K. W. Eliceiri, *Nat. Methods*, **9**, 671 (2012).