Electronic Supplementary Material (ESI) for Inorganic Chemistry Frontiers.

Supporting Information for

Particle size effects in the catalytic electrooxidation of liquid fuel on PtAg nanoparticles

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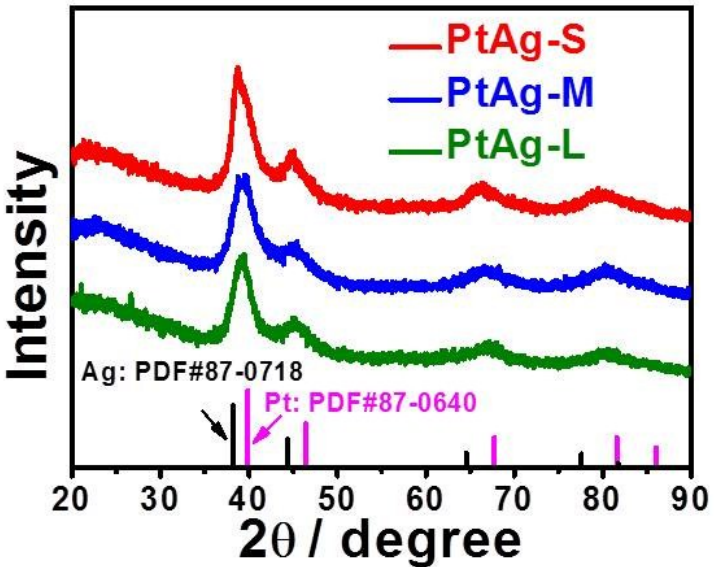

Figure S1 XRD patterns of PtAg-S, PtAg-M and PtAg-L

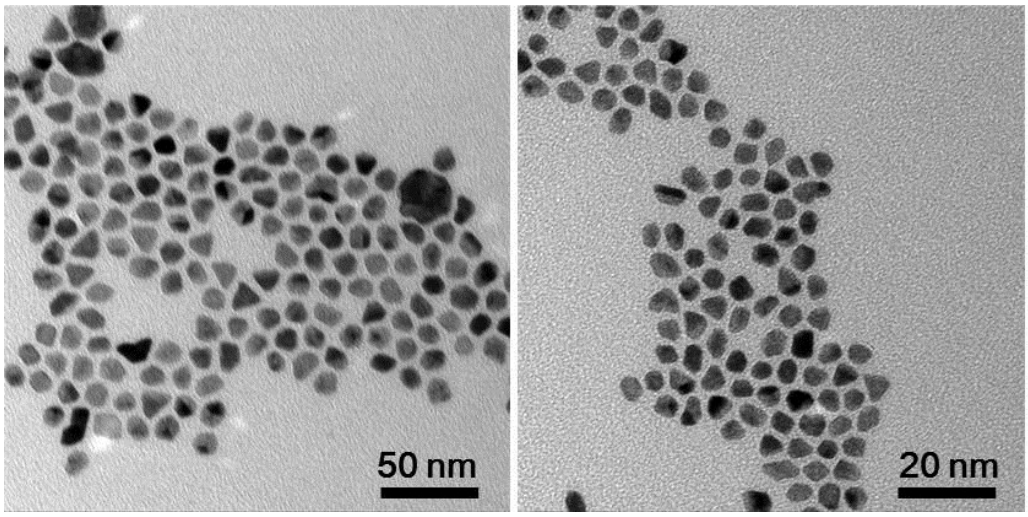

Figure S2 Representative TEM images of PtAg nanocrystals with different magnifications prepared in the absence of phloroglucinol.

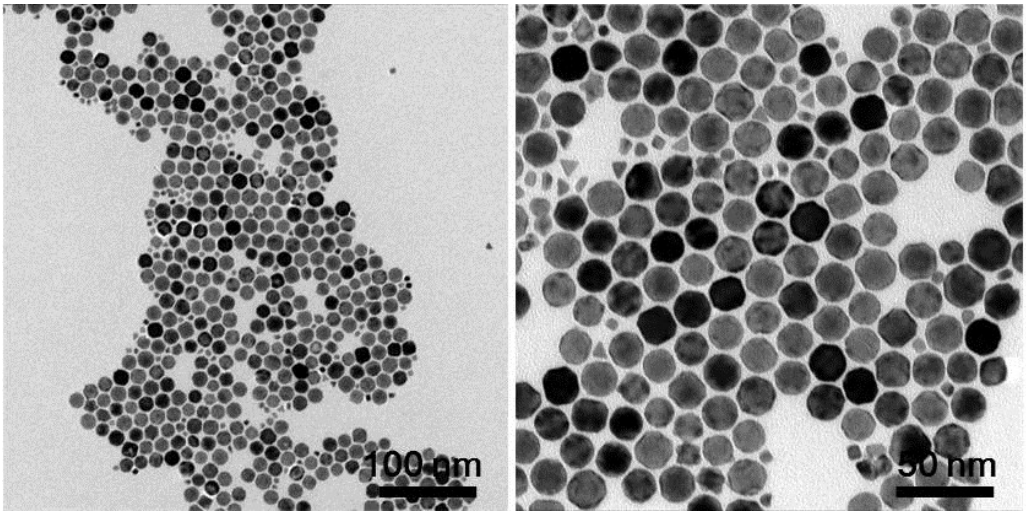

Figure S3 Representative TEM images of PtAg nanocrystals with different magnifications prepared by substituting the CTAB with CTAC.

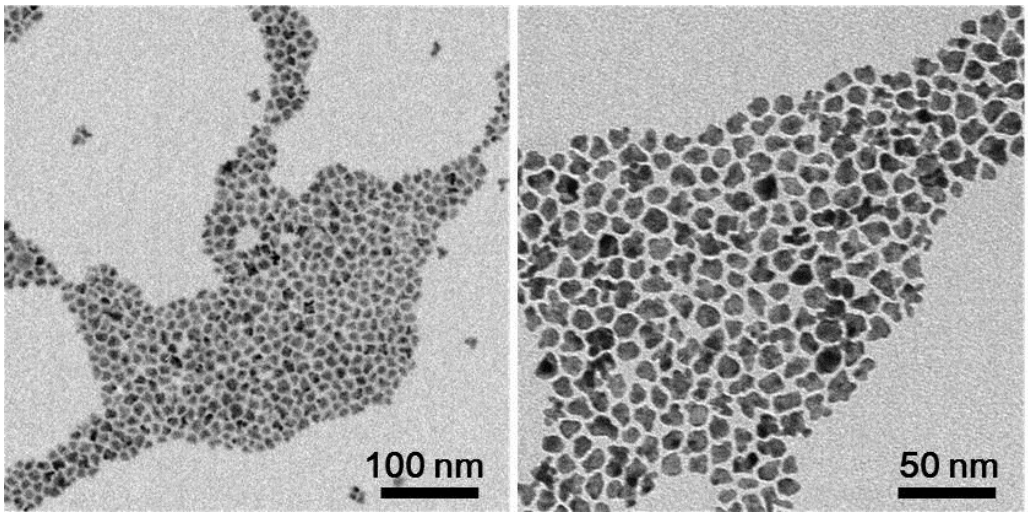

Figure S4 Representative TEM images of PtAg nanocrystals with different magnifications prepared in the absence of CTAB.

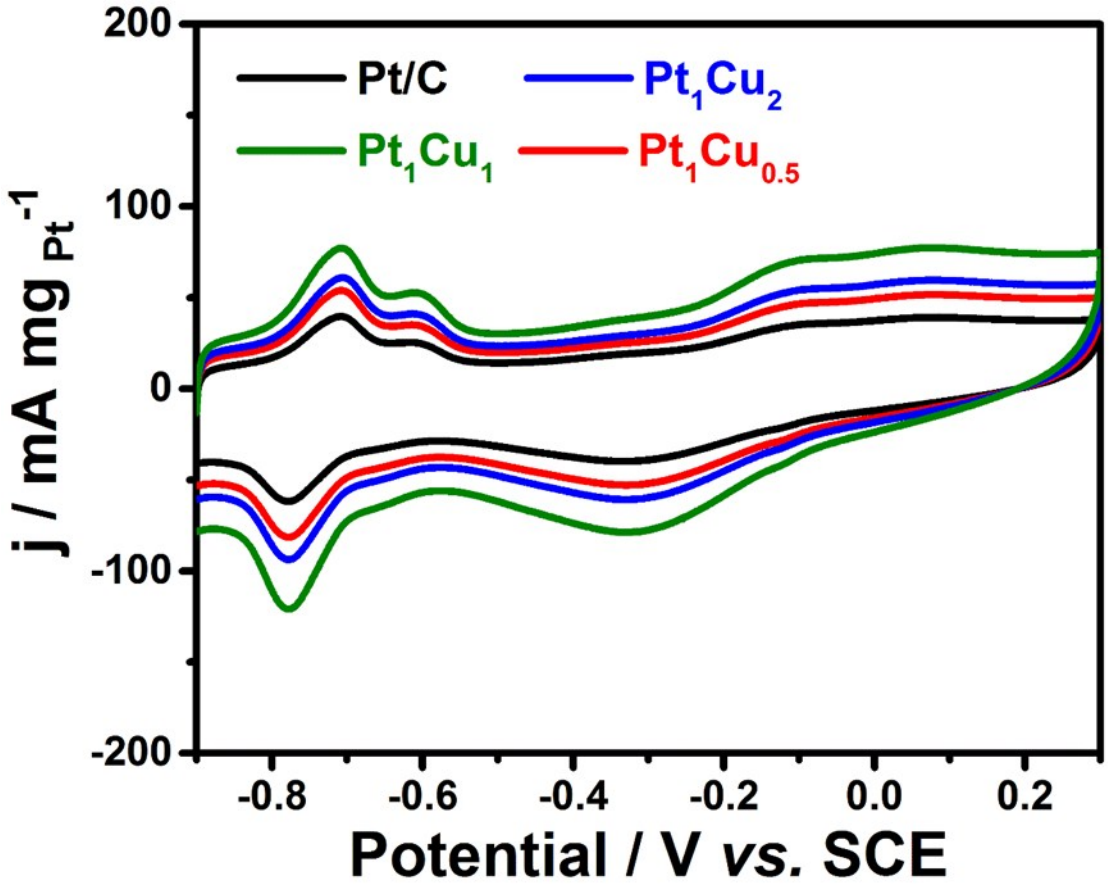

Figure S5 The CV curves of PtAg-S, PtAg-M, PtAg-L NPs and commercial Pt/C in 1 M KOH solution.

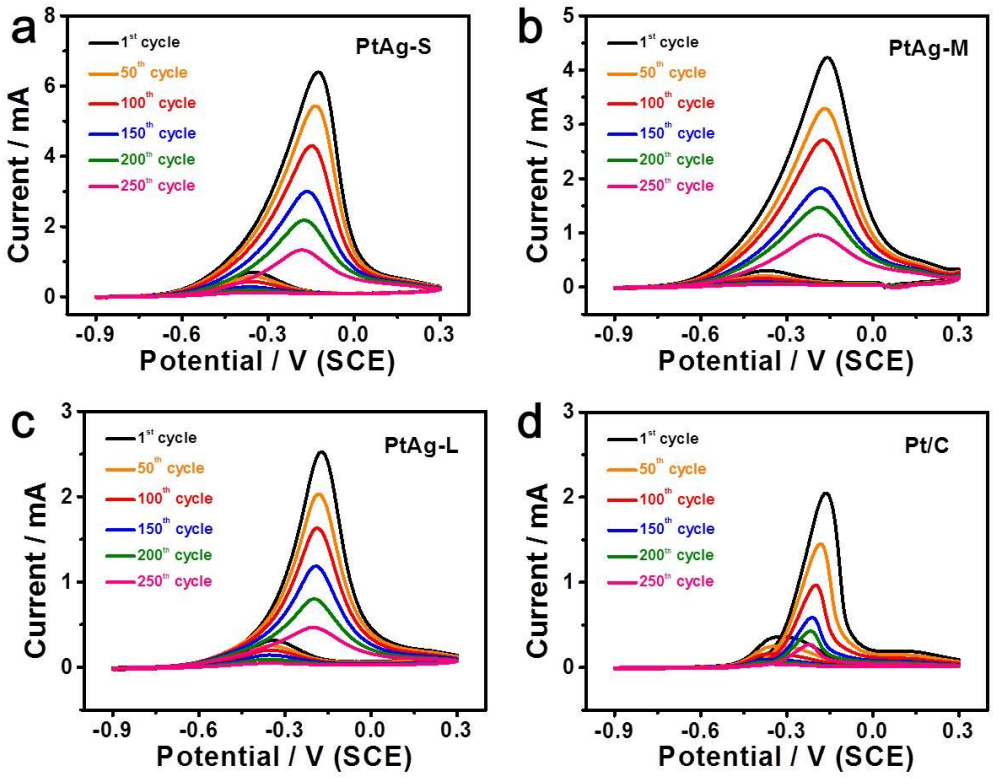

Figure S6 CVs (1st, 50th, 100th, 150th, 200th, and 250th cycle) of (a) the PtAg-S NPs, (b) PtAg-M NPs, (c) PtAg-L NPs and (d) commercial Pt/C for EGOR, respectively. The CVs were operated in the solution of 1 M KOH and 1 M EG at the scan rate of 50 mV s^{-1}.

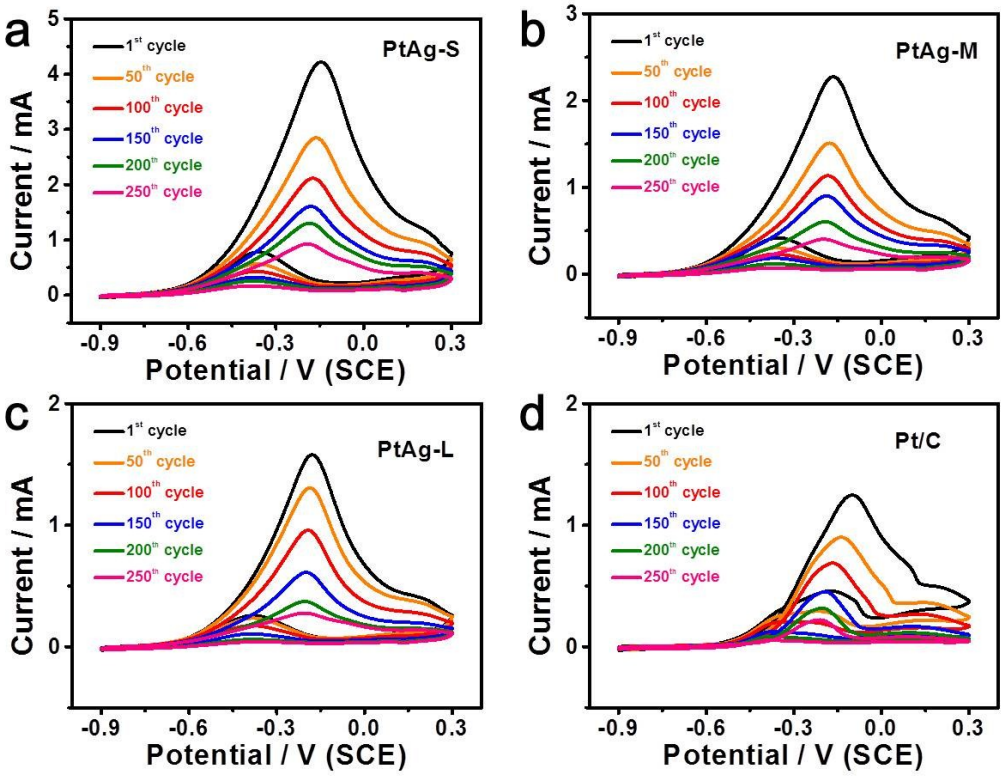

Figure S7 CVs (1st, 50th, 100th, 150th, 200th, and 250th cycle) of (a) the PtAg-S NPs, (b) PtAg-M NPs, (c) PtAg-L NPs and (d) commercial Pt/C for GOR, respectively. The CVs were operated in the solution of 1 M KOH and 1 M glycerol at the scan rate of 50 mV s^{-1}.

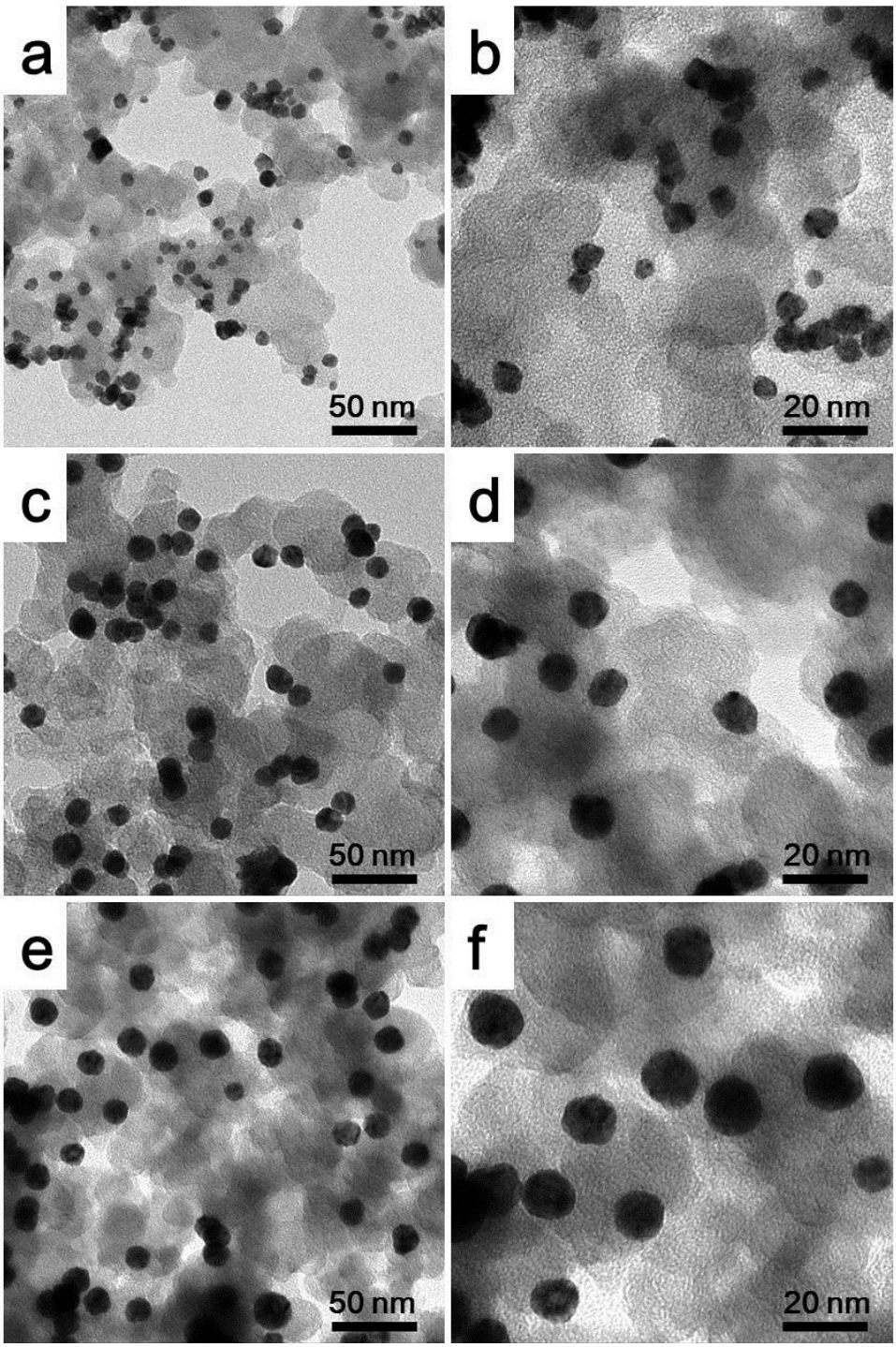

Figure S8 Additional TEM images of the PtAg-S/C NPs, PtAg-M/C NPs and PtAg-L/C NPs.

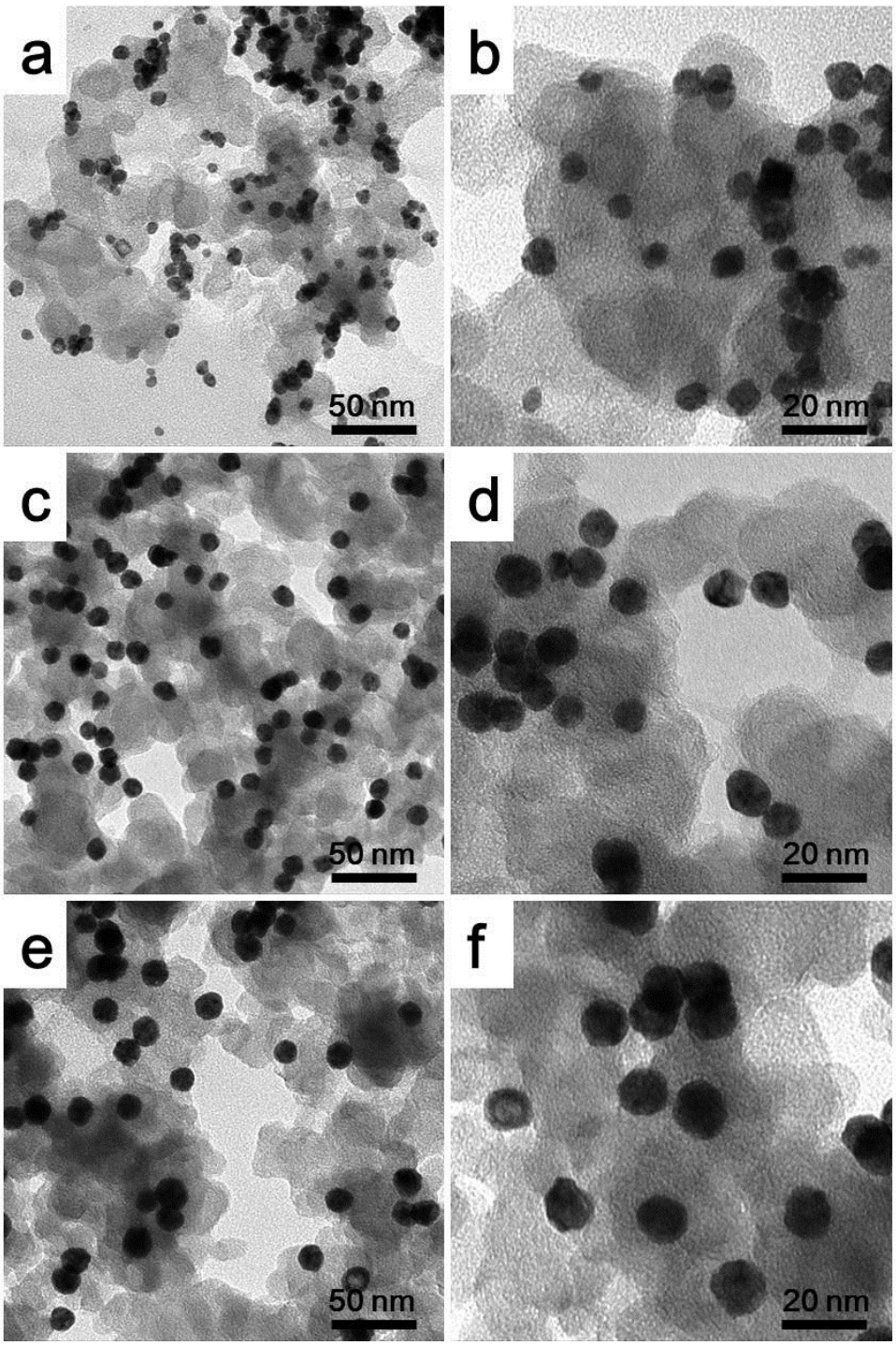

Figure S9 TEM images of (a, b) PtAg-S/C NPs, (c, d) PtAg-M/C NPs, and (e, f) and PtAg-L/C NPs after 250 cycles in 1 M KOH and 1M EG solution at 50 mV s^{-1}.

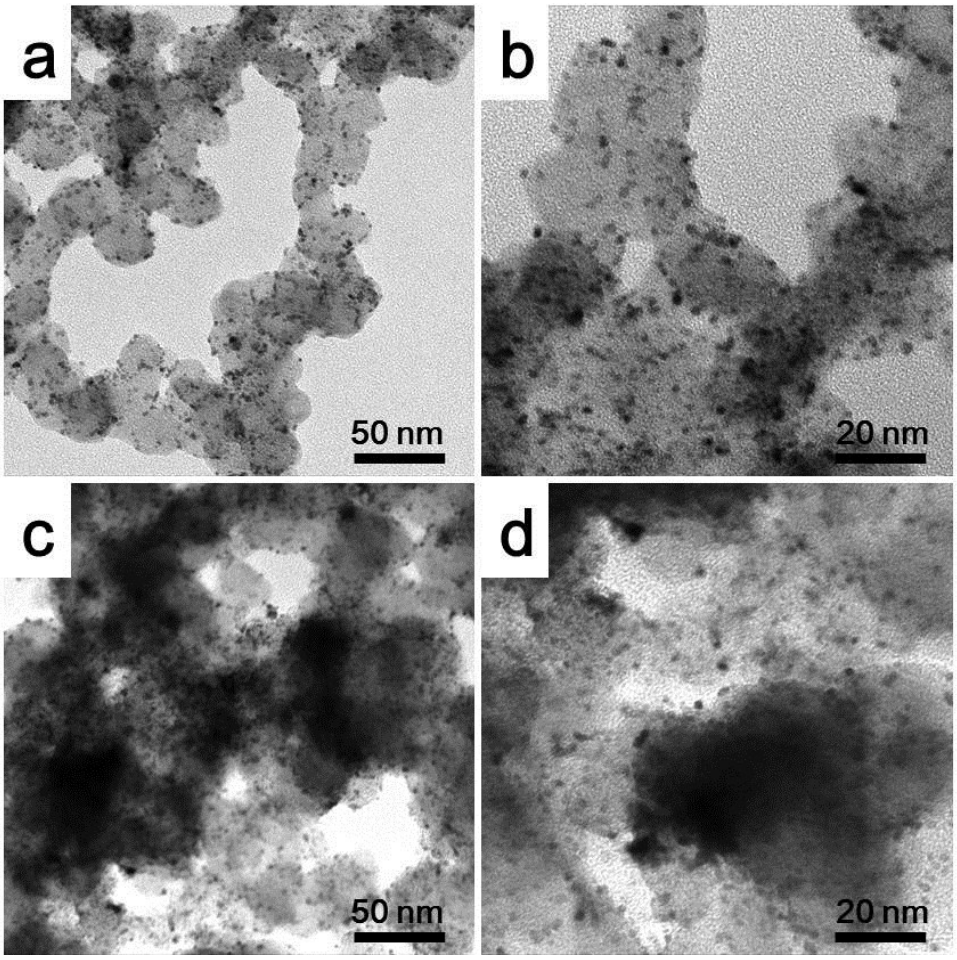

Figure S10. TEM images of Pt/C (a, b) before and (c, d) after 250 cycles in 1 M KOH containing 1M EG at 50 mV s^{-1}.

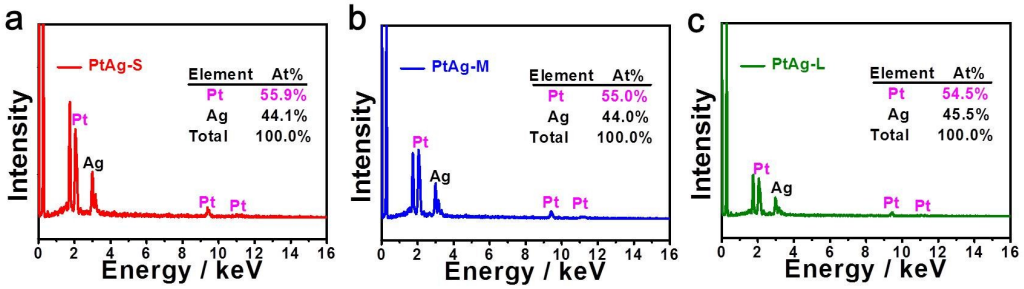

Figure S11 SEM-EDS of (a) PtAg-S/C NPs (b) PtAg-M/C NPs and (c) and PtAg-L/C NPs after 250 cycles in 1 M KOH containing 1M EG at 50 mV s^{-1}.

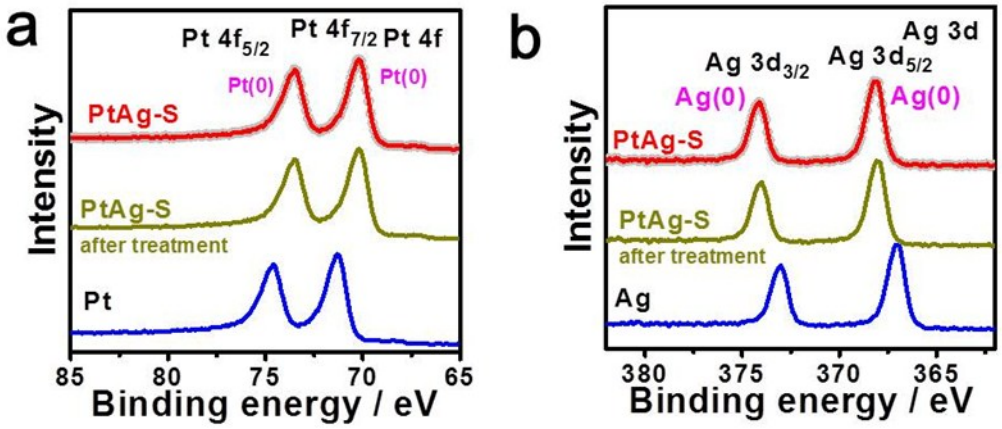

Figure S12 The typical XPS spectra of (a) Pt 4f and (b) Ag 3d in the PtAg-S NPs and PtAg-S NPs after treatment. the XPS spectra of pure Pt and pure Ag have also selected as references.

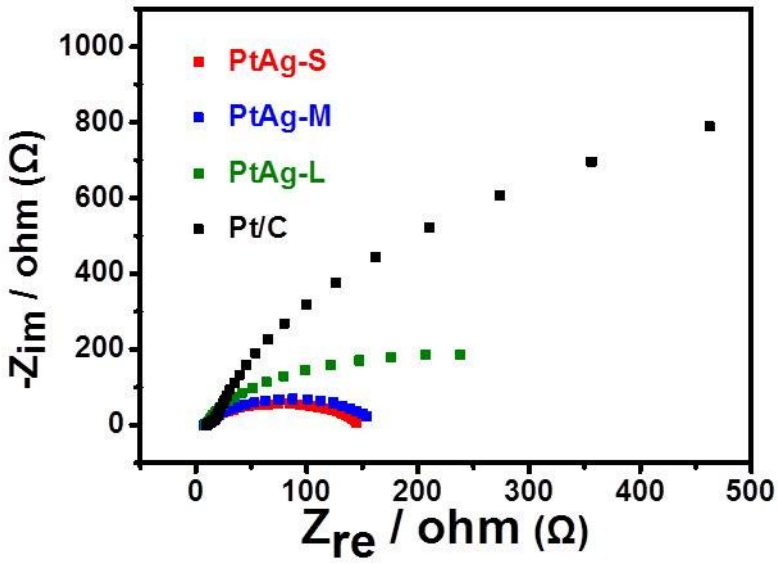

Figure S13 Nyquist plots of these four electrocatalysts operated in the solution of 1 M KOH + 1 M EG at the potential of -0.3 V after 250 cycles.

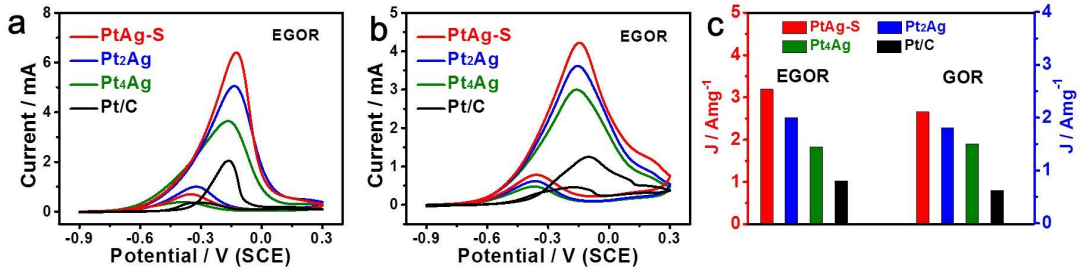

Figure S14 CVs of the PtAg-S NPs, Pt_2Ag NPs, Pt_4Ag NPs and commercial Pt/C for (a) EGOR and (b) GOR, respectively. (c) Mass activities for EGOR and GOR.

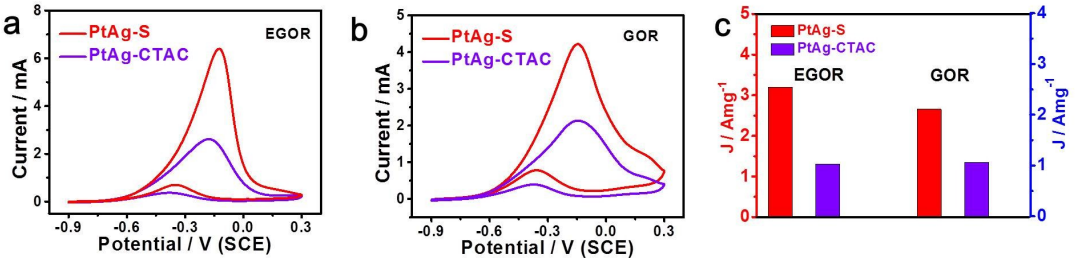

Figure S15 CVs of the PtAg-S NPs and PtAg-CTAC for (a) EGOR and (b) GOR, respectively. (c) Mass activities of PtAg-S NPs and PtAg-CTAC for EGOR and GOR.

Table S1 Comparison of PtAg-S NPs catalysts with other Pt-based electrocatalysts for the EGOR.

Catalysts	Peaks currents from CV curves J_m (A/mg)	Electrolyte	References
PtAg-s NPs	3.20	1.0 M KOH + 1.0 M EG	This work
$Pt_{4.5}Pb$ NWs	0.73	0.1M $HClO_4$ + 0.5 M EG	Small **2016**, *12*, 4464- 4470
$Pt_{5.7}Pb$ NWs	0.63		
Pt-Sn Nanocrystals/CNT	0.22	0.5 M H_2SO_4 + 1 M EG	Int. J. Hydrogen Energy **2011**, *36*, 5, 3313-3321
Pt-Ru Nanocrystals/CNT	0.175	0.5 M H_2SO_4 + 1 M EG	Int. J. Hydrogen Energy **2012**, *37*, 9941-9947.
PtPd@Pt Nanocrystals/rGO	0.23	0.5 M H_2SO_4 + 0.5 M EG	Electrochim. Acta **2016**, *18*, 576-583.
$PtNi_{0.67}Pb_{0.26}$ NWs/C	0.42	0.1 M $HClO_4$ + 0.2 M EG	J. Mater. Chem. A **2017**, *5*, 18977-18983
PtRu alloy	3.052	1.0 M KOH + 1.0 M EG	Int. J. Hydrogen Energy **2017**, *42*, 20720-20728

Table S2 Comparison of PtAg-S NPs catalysts with other electrocatalysts for the GOR.

Catalysts	Peaks currents from CV curves Jm (A/mg)	Electrolyte	References
PtAg-S	2.11	1.0 M KOH + 1.0 M Glycerol	This work
$PtNi_{0.67}Pb_{0.26}$ NWs/C	0.36	0.1 M HClO4 + 0.2 M Glycerol	J. Mater. Chem. A 2017, 5, 18977-18983
PtNi/C	0.204	0.5 M KOH + 2.0 M Glycerol	Appl. Catal. A 2012, 429-430, 39-47
Pd-CNx/G	1.1	0.5 M KOH + 0.5 M Glycerol	ACS Catal. 2015, 5, 3174-3180
$Pd_{50}Ni_{50}$/C	0.190	0.1 M KOH + 0.1 M Glycerol	Electrocatal. 2013, 4, 167-178
Pd_3Sn/phen-C	0.175	0.1 M KOH + 0.5 M Glycerol	Int. J. Hydrogen Energy 2016, 41, 1272-14280
Pd-NiOx-P/C	0.364	0.1 M KOH + 0.5 M Glycerol	Chem. Eng. J. 2017, 38, 419-427
PtAg nanotubes	0.208	0.5 M KOH + 0.5 M Glycerol	Electrochem. Commun. 2014,46,36-39