Electronic Supplementary Material (ESI) for RSC Advances.

Electrochemical-reduction-assisted assembly of ternary Ag nanoparticles/ polyoxometalate/ graphene nanohybrids and its activity in the electrocatalysis of oxygen reduction

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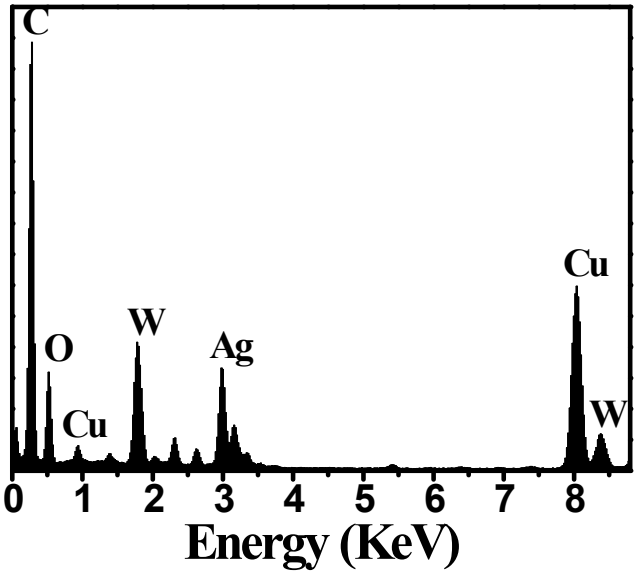

Fig. S1 EDX analysis of 30% Ag NPs@POM/rGO nanohybrids.

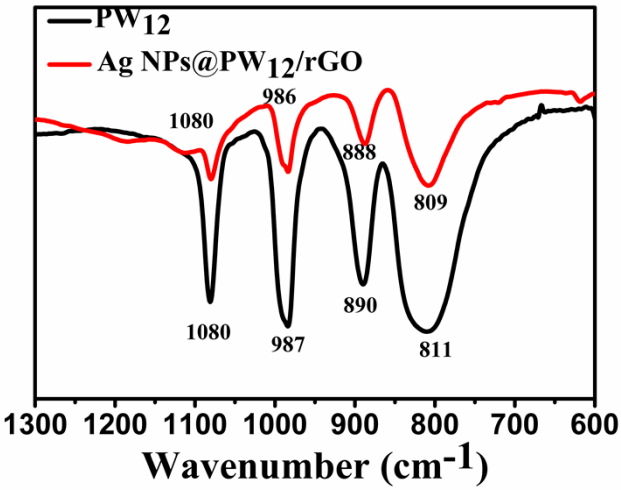

Fig. S2 FT-IR spectra of the prepared 30% Ag NPs@POM/rGO nanohybrid as well as the pure PW_{12}.

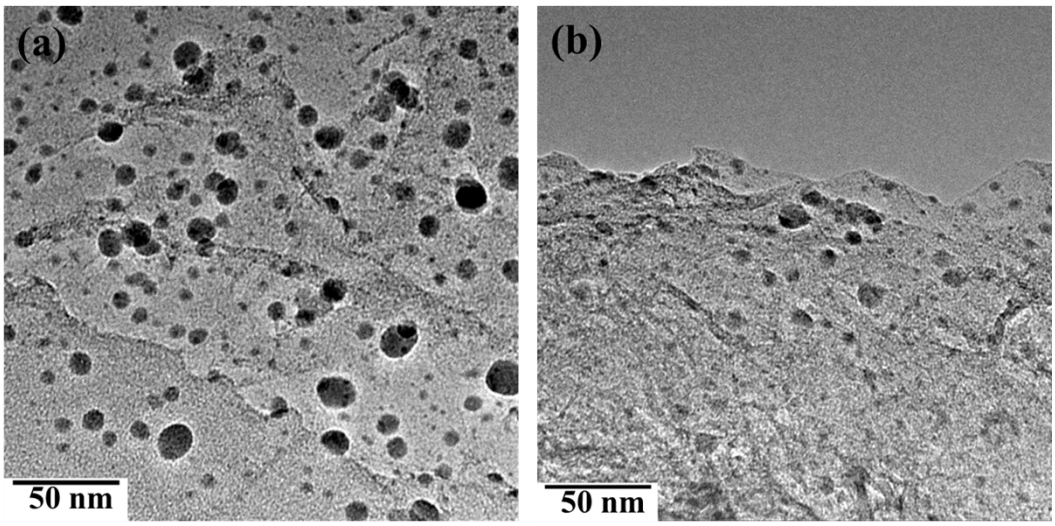

Fig. S3 Typical TEM images of (a) 20% Ag NPs@POM/rGO and (b) 10% Ag NPs@POM/rGO.

Table S1 The main characteristics determined from the voltammograms on the five electrodes as shown in Fig. 5 in the text.

Electrode material	E_{pc} / V vs. RHE	i_{pc} / mA cm^{-2}
Ag NPs@POM	0.55	-0.52
POM/rGO	0.53	-0.73
10% Ag NPs@POM/rGO	0.60	-1.17
20% Ag NPs@POM/rGO	0.71	-1.34
30% Ag NPs@POM/rGO	0.74	-1.42

Table S2 The numbers of electrons transferred for ORR on the five electrodes calculated from the slopes of the Koutecky–Levich plots (shown in Fig. 6, see in the text) at various potentials.

Electron number / Electrode / Potential	Ag NPs@POM	POM/rGO	10% Ag NPs@POM/rGO	20% Ag NPs@POM/rGO	30% Ag NPs@POM/rGO
0.15 V vs. RHE	1.90	2.43	3.82	3.95	4.20
0.25 V vs. RHE	1.83	2.26	3.92	3.73	4.06
0.35 V vs. RHE	1.71	2.05	4.2	3.57	3.97
0.45 V vs. RHE	1.60	1.88	4.33	3.65	4.01
0.55 V vs. RHE	1.52	1.72	4.28	3.67	4.04

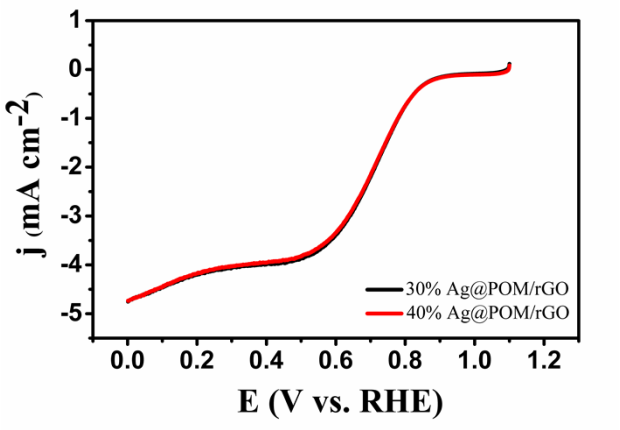

Fig. S4 Linear sweep voltammetry curves of ORR in O_2-saturated 0.1 M KOH solutions at a scan rate of 10 mV s^{-1}. The rotation rate is 1600 rpm.

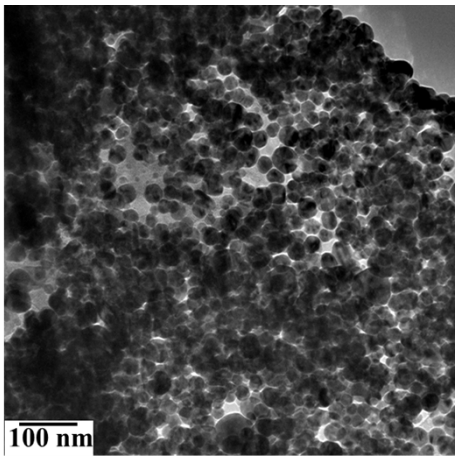

Fig. S5 Typical TEM image of 40% Ag NPs@POM/rGO.

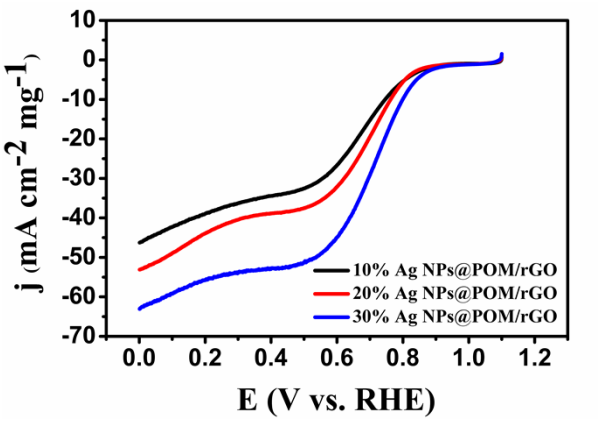

Fig. S6 RDE polarization curves of Ag NPs@POM/rGO with different Ag loadings at a scan rate of 10 mV s^{-1}. The rotation rate is 1600 rpm.

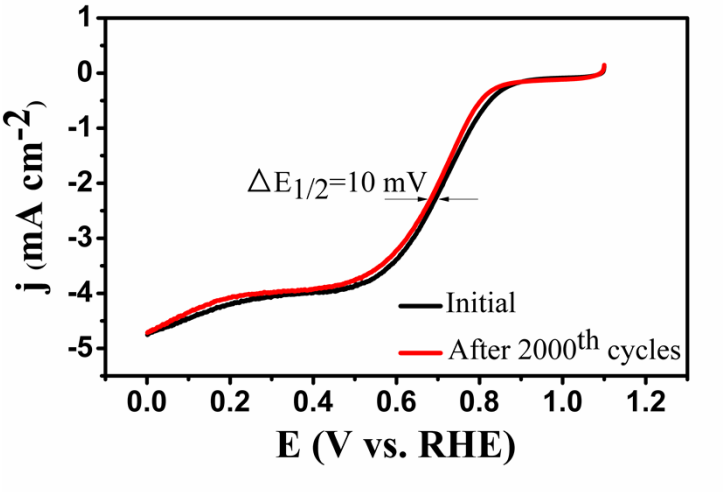

Fig. S7 RDE polarization curves of 30% Ag NPs@POM/rGO at a scan rate of 10 mV s^{-1} before and after 2000 potential cycles in O_2-saturated 0.1 M KOH solution. The rotation rate is 1600 rpm.