Supporting Information

Facile and Green Synthesis of Surfactant-Free Au Clusters/Reduced Graphene Oxide Composite as Efficient Electrocatalyst for Oxygen Reduction Reaction

Shengjie Xu, Peiyi Wu*

Laboratory of Advanced Materials, State Key Laboratory of Molecular Engineering of Polymers, Department of Macromolecular Science, Fudan University, Shanghai, 200433, P. R. China.

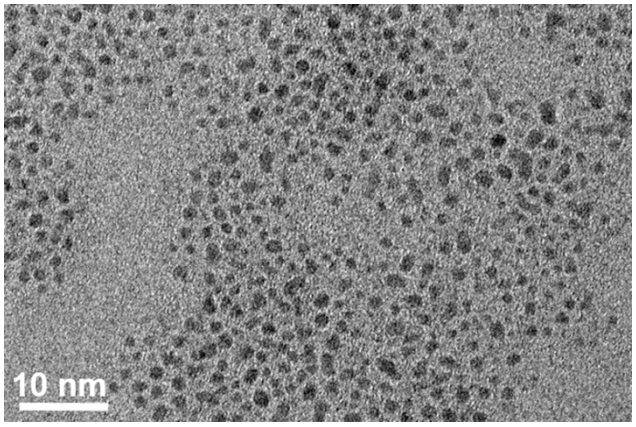

Fig. S1 TEM image of Au clusters prepared with DMF.

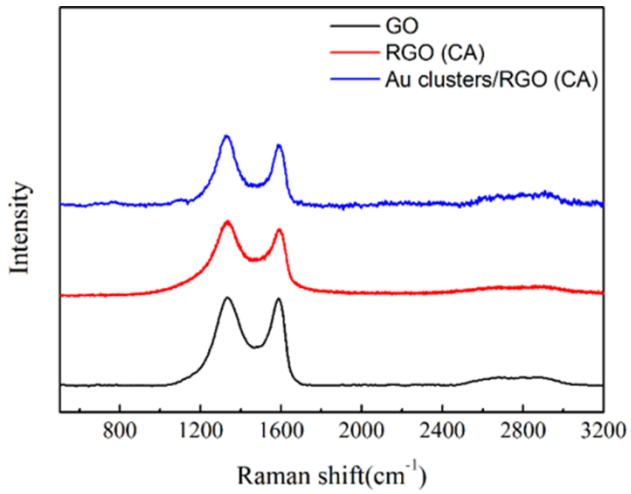

Fig. S2 Raman spectra of GO, RGO, and Au clusters/RGO composite prepared with CA.

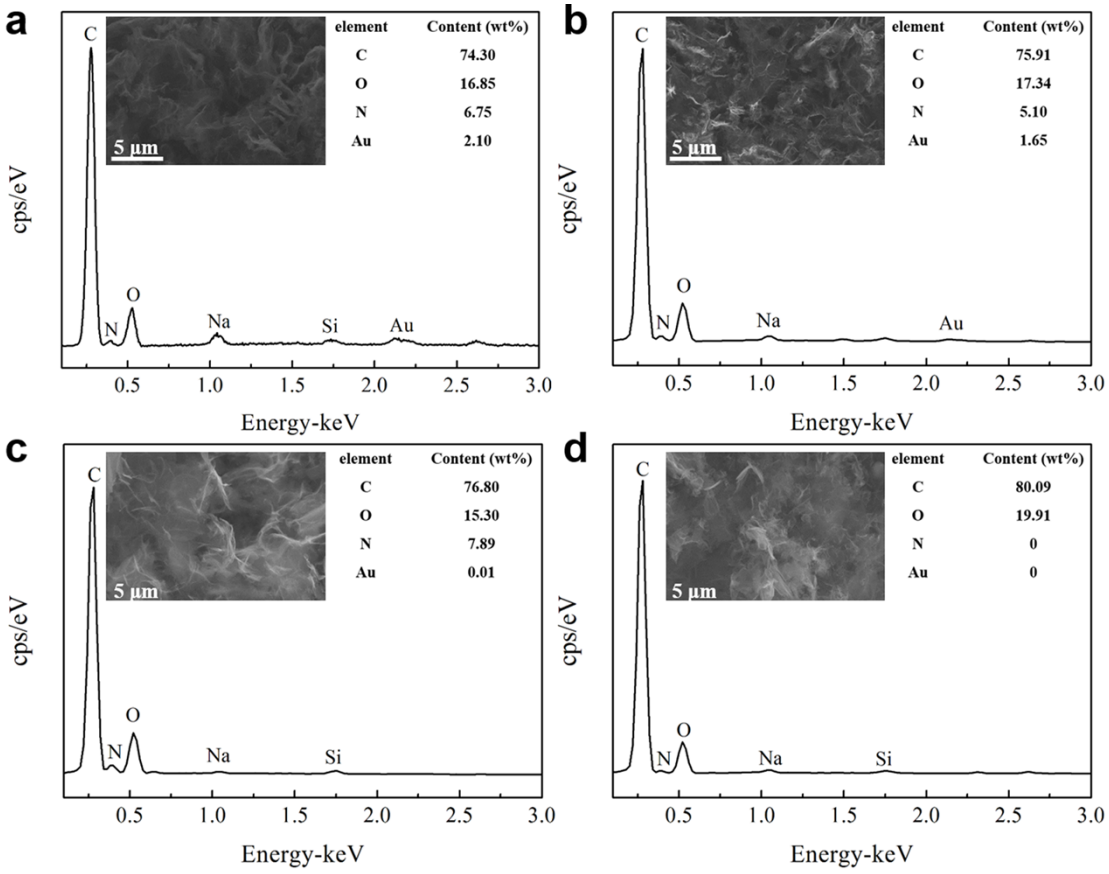

Fig. S3 EDS patterns of Au clusters/RGO composites prepared with different agents: (a) CA, (b) AA, (c) N_2H_4/NH_3, and (d) DMF. The inset shows the SEM image of selected area for EDS and the contents of different elements (C, O, N, and Au).

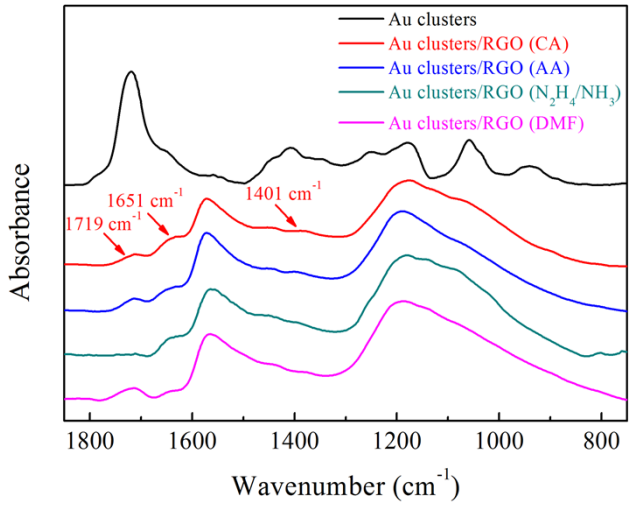

Fig. S4 FTIR spectra of Au clusters and Au clusters/RGO composites prepared with CA, AA N_2H_4/NH_3 and DMF.

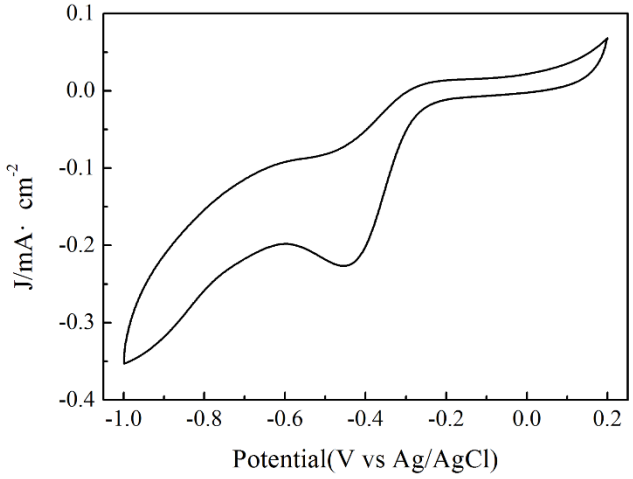

Fig. S5 CV curve of RGO reduced by CA in O_2 saturated 0.1 M KOH solution.

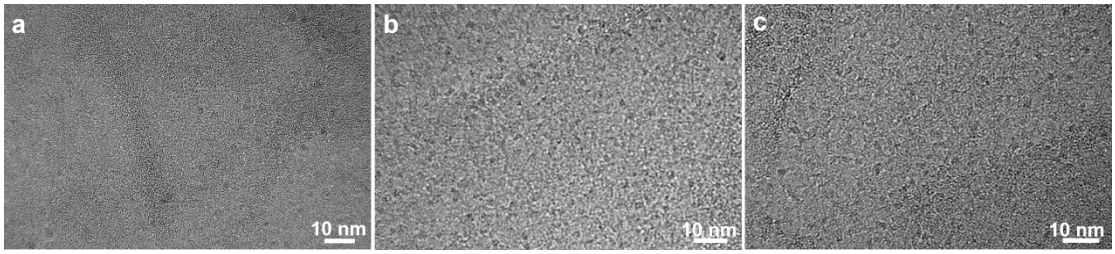

Fig. S6 (a) TEM image of Au clusters/RGO composites (CA) prepared with different ratio of Au cluster: RGO. (a) 1:1; (b) 2.5:1 and (c) 4:1.

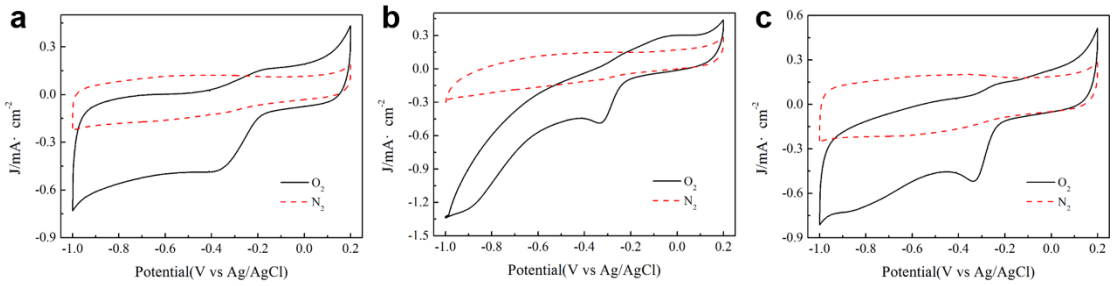

Fig. S7 CV curves of Au clusters/RGO composites directly prepared in DMF solution at 140 °C; (b) and (c) CV curves of Au clusters/RGO composites prepared with N_2H_4/NH_3 and ascorbic acid (AA). All the ratio of Au clusters: RGO are 5:1.

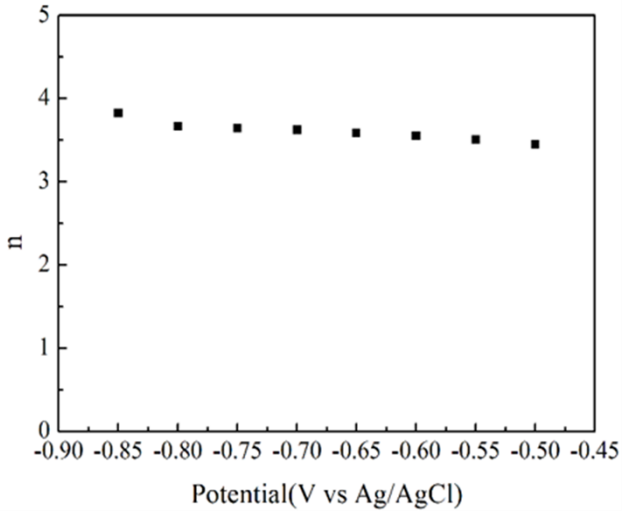

Fig. S8 The dependence of *n* value for Au clusters/RGO composite (CA) on the potential.

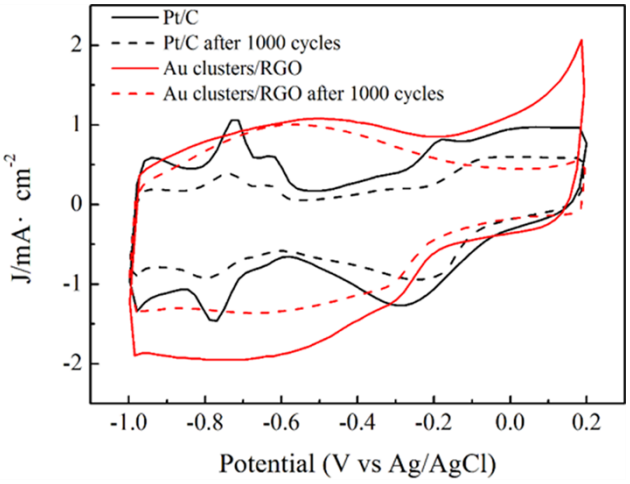

Fig. S9 Comparison of the electrochemical stability of commercial Pt/C and Au

clusters/RGO composite prepared with CA by continuous cyclic voltammetry in O_2-saturated 0.1 M KOH solution

Table S1. Tentative band assignments of DMF protected Au clusters

Wavenumber (cm^{-1})	Assignment
1719	*v*(C=O) of carboxylic acid group
1651	amide I
1557	amide II
1441, 1342	*v*(C-H)
1403	*v*(C-N) and CH_3 deformation
1252, 1178	*v*(C-O)
1057, 1037	*v*(C-N) and *v*(C-H)
939	*v*(C-C)