

Supporting Information

Preparation of Polymer decorated Graphene Oxide by γ -Ray Induced Graft Polymerization

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Experimental section

The hydrolysis of GO-g-PVAc

GO-g-PVAc (20 mg) was dispensed in 20 mL methanol by sonication for 30 minutes, and then 0.2 mL 25 wt% NaOH methanol solutions was added and stirred at room temperature for 24 hours. After that, excessive water was added into the solution. Then the mixture was filtrated with 0.22 μ m acetyl cellulose membrane and the GO-g-PVA was obtained by removal of acetyl cellulose membrane and dried in vacuum oven at 60 °C overnight.

Caption of Figure and Table:

Figure S1 XPS C1s spectra of (a) GO-g-PVA and (d) γ -ray irradiated GO; O1s spectra of (b) GO and (d) GO-g-PVAc.

Figure. S2 Photos of the dispersion of γ -ray irradiated GO in various organic solvents. The pictures were taken 1 hour after preparation.

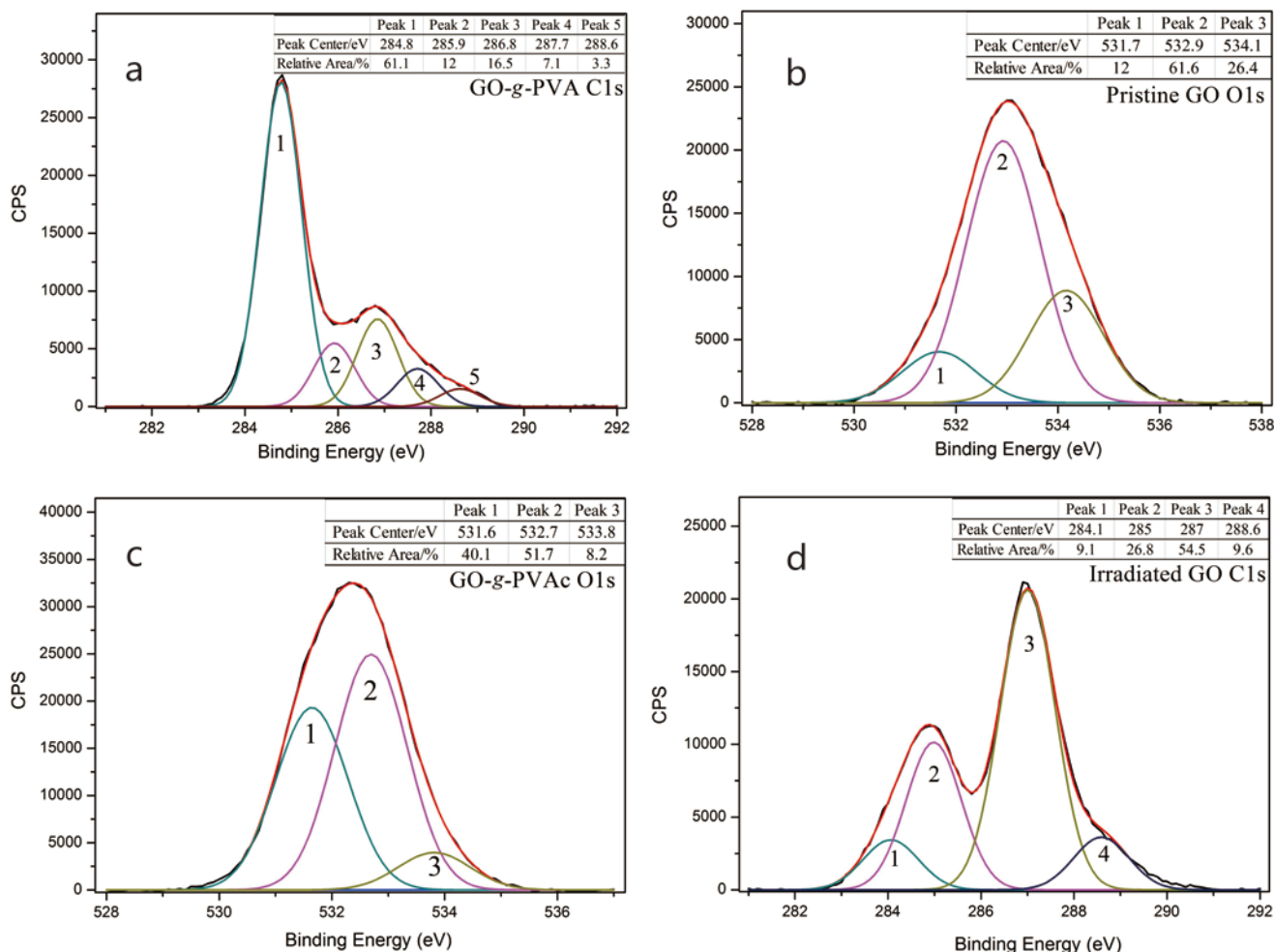


Figure S1

Figure S1a shows the **relative area** of C=O peak at 288.6 eV is decreased to 3.3, which is similar to that of GO, and the peak at 286.8 eV also decreased by comparing with that **GO-g-PVAc**, when **GO-g-PVAc** is hydrolyzed. These results demonstrate the grafted PVAc chain is almost complete hydrolysis.

Figure S1b&c show three Gaussian peaks at 531.6 eV (C=O group), 532.8 eV (C-OH/C-O) and 534.1 eV (H₂O) in both GO and **GO-g-PVAc** samples. After the grafted PVAc onto GO, the intensity of C=O group (531.6 eV) is increased obviously, and the H₂O peak decreased, which would indicated the replacement of water by PVAc chains in the interlayers.

Figure S1d shows the peak of graphite Carbon is extremely weaken and a very strong peak at 285 eV is appeared, which can be assigned to the peak of C-H. Additionally, the intensity of C-O/epoxy (287 eV) and carbonyl groups (288.8 eV) are also increased obviously. That is mean GO has reacted with the radiolysis products (i.e., $\cdot C_2H_5$, $CH_3COO\cdot$ and $\cdot CH_2COOC_2H_5$).

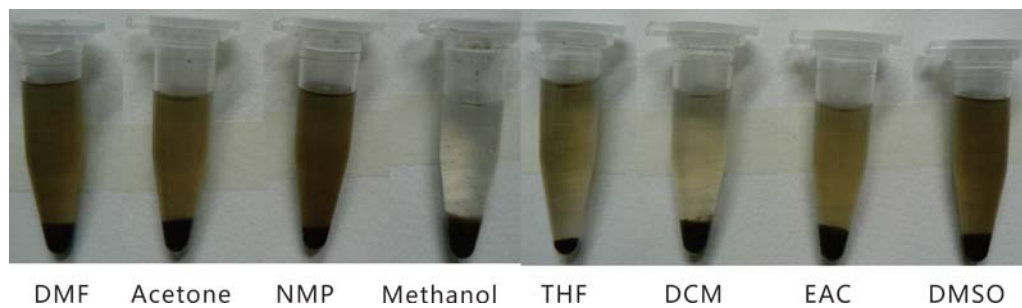


Figure S2

Figure S2 shows that the GO irradiated in pure EAc by γ -ray cannot form stable dispersion in the common organic solvents.