**Fig. S1.** (a) The UV-Vis absorption of different GQDs; (b) a photograph of GQDs and rGQDs with different level; (c) a photograph of GQDs and rGQDs after scavenging DPPH• free radical.

**Fig. S2.** (a) The UV-Vis absorption of different GQDs$_{0-18}$; (b) a photograph (from left to right) is GQDs$_0$, GQDs$_4$, GQDs$_8$, GQDs$_{18}$ respectively.

From the UV-Vis absorption spectrum in **Fig. S1 and S2**, it can be seen that, after the concentration adjustment, a similar absorption behavior at ca. 237 nm was shown. This absorption peaks were caused by the transition from $\pi$ to $\pi^*$ of carbon-carbon bonds$^{[1]}$. 
**Fig. S3** (a) TEM images and size distributions (inserts) of GQDs, rGQDs\(_1\), rGQDs\(_2\), and rGQDs\(_3\). (b) AFM image and (c) its height distribution of GQDs, rGQDs\(_1\), rGQDs\(_2\) and rGQDs\(_3\).

**Fig. S4** (a) TEM images and size distributions (inserts) of GQDs\(_4\), GQDs\(_8\), and GQDs\(_{18}\). (b) AFM image and (c) its height distribution of GQDs\(_4\), GQDs\(_8\), and GQDs\(_{18}\).
The TEM and AFM images and their height profiles of each kind of GQDs are shown in Fig. S3 and S4. The white dots in Fig.S3b and S4b represent GQDs and their specific point thickness values are shown in Fig.S3c.

**Fig. S5.** (a) Raman spectra before and after GQDs react with DPPH•. (b) ID/IG ratio before and after GQDs react with DPPH•.

The Raman spectra of GQDs from GQDs-0 to GQDs-18 before and after reaction with DPPH• were measured, as shown in Fig.S5, to confirm the adduct formation mechanism. Before reaction with DPPH•, the values of ID/IG for four GQDs are 0.996 (GQDs-0), 0.998 (GQDs-4), 1.044 (GQDs-8), 0.984 (GQDs-18) respectively. After reaction with DPPH• radicals, the values of ID/IG are 1.068 (GQDs-0), 1.082 (GQDs-4), 1.079 (GQDs-8), 1.052 (GQDs-18), respectively. The values of ID/IG ratio after GQDs reaction with DPPH• radicals are higher than before. This confirms that the grafting of DPPH• on GQDs surface increased defect level of GQDs.

**Reference**