

Preparation and Adsorption Performance Study of Graphene Quantum Dots@ZIF-8 Composites for Highly Efficient Removal of Volatile Organic Compounds

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1. ZETA potential analysis

The ZETA potentials of the GQDs, ZIF-8 and the GQDs@ZIF-8 composites were measured by a zeta potential analyzer (Malvern, Zetasizer ZS90) in liquid phase without pH adjustment, and the results are shown in Table S1. The ZETA potentials of GQDs and ZIF-8 are -26.2 mV and 19.6 mV, respectively. After the compounding, the ZETA potential of the GQDs@ZIF-8 composite became 15.7 mV, revealing that GQDs was successfully grafted on the surface of ZIF-8, which was connected by strong electrostatic attraction with good stability.

Table S1. ZETA potentials of GQDs, ZIF-8 and the GQDs@ZIF-8 composite

	GQDs	ZIF-8	ZIF-8@GQDs
ZETA potential (mV)	-26.2	+19.6	+15.7

2. Effect of GQD content on the removal percentage of toluene and ethyl acetate

The influence of the GQD content (weight content of GQDs in GQDs@ZIF-8 composites) on the adsorption property of the GQDs@ZIF-8 composites was studied, with the GQD contents of 0, 3, 5 and 7%, respectively. The sample mass of 100 mg, toluene concentration of 400 mg/L, ethyl acetate concentration of 800 mg/L, adsorption time of 180 min, and pH value of 7 were applied. When the GQD content of 0% was applied, the raw ZIF-8 was obtained, as presented in Section 3.6 of the manuscript (Figures 8-10). When the GQD content was 5%, the adsorption property was the best. When the GQD content increased to 7%, the excessive GQDs trended to agglomerate on the surface of ZIF-8, causing the reduction of the adsorption property. Therefore, based on the experimental results, we chose a GQD content of 5% in this study.

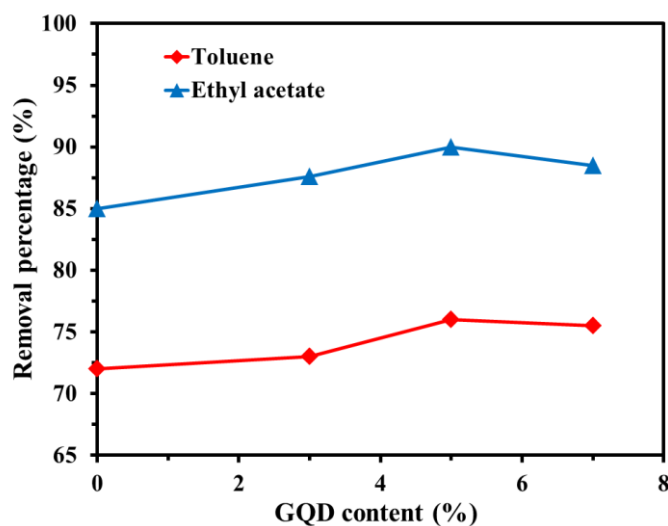


Figure S1. Effect of GQD content on the removal percentage of toluene and ethyl acetate