# Assembly of Ni-Al layered double hydroxide and oxide graphene quantum dots for supercapacitors

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**Chemicals.** Hexachlorobenzene was purchased from Beijing HWRK Chem. Co., LTD. Mg, NaOH, HNO3(65%), H2SO4(98%), C7H8(Toluene), C36H70MgO4(Magnesium stearate), C2H6O(Ethanol), Ni(NO3)2, Al(NO3)3, NaNO3, (CH3)3CCH2CH(CH3)2(Isooctane), C12H25SO4Na(Sodium dodecyl sulfate), CH3(CH2)3OH(Butyl alcohol), CH3COCH3(Acetone), CH3NO(Formamid) were purchased from Tianjin Kemiou Chemical Reagent Co., Ltd. All chemicals were of analytical grade and used without further purification.

**The characterization of** **GQDs, NiAl-LDH and Composite materials**

The crystallographic structures of the samples were determined by a X-ray diﬀraction system (XRD) (X，Pert PRO) equipped with Cu Kα radiation (λ=1.5442 Å) at 40 kV and 40 mA and at a scanning rate of 5°/min. Transmission electron microscopy (TEM) measurements were carried on a Tecnai G2 20 S-TWIN transmission electron microscope (FEI) at the accelerating voltage of 200 kV. The sample for TEM characterization was prepared by placing several drops of nitrogen-doped CQDs solution on an ultrathin 230 square mesh copper grid and dried at room temperature. Fourier transform infrared (FTIR) spectra were collected on a Bruker Tensor 27 spectrometer in the range of 400-4000 cm-1 using thin pellet samples prepared on potassium bromide background. X-ray photoelectron spectroscopy (XPS) measurements were carried out by a Thermo escalab 250Xi spectrometer with monochromated Al Kα radiation (hν=1486.6 eV) at 150 W. Raman spectra were acquired with a Renishaw inVia Raman system powered by a 633 nm laser. Thermogravimetric analysis (TGA) was carried out with a STA409 PC/PG instrument by heating from 30 ℃ to 950 ℃ under Ar atmosphere at a rate of 10 ℃/min.

Captions.

1. FT-IR spectra of GQDs, NiAl-LDH and OGL9 in Figure S1.
2. Raman spectra of GQDs and OGL9 in Figure S2.
3. TGA curves of GQDs, NiAl-LDH and OGL9 in Figure S3.