

Supplementary Information for

Preparation and Characterization of Synthetic Graphite Materials with Hierarchical Pores from Lignite by One-step Impregnation as Dye Absorbent

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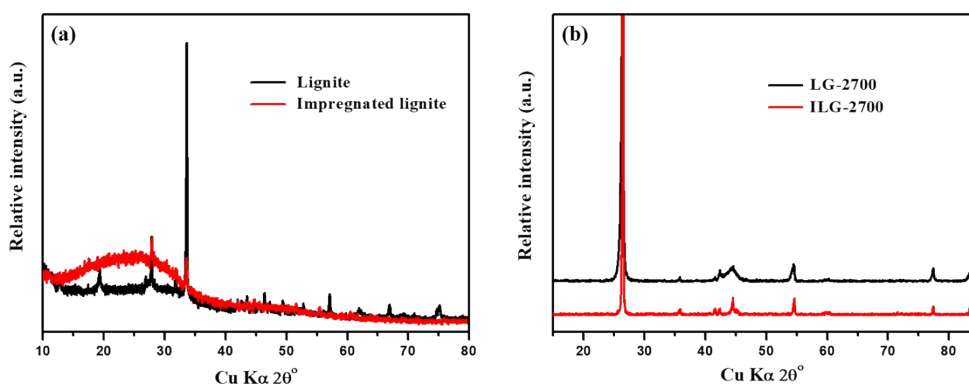


Fig. S1. Comparison of XRD patterns of lignite and impregnated lignite (a), LG-2700 and ILG-2700 (b).

Table S1. Structural parameters of LG-2700 and ILG-2700.

Sample	d_{002} (nm)	g (%)	L_a (nm)	L_c (nm)
LG-2700	0.3372	79.5	26.44	29.38
ILG-2700	0.3369	82.6	178.56	110.43

The following is the additional description and discussion about Fig. S1 and Table S1:

After impregnation, the ash content in the raw coal was greatly reduced. However, the (002) diffraction peak of the products after high temperature graphitization was not very different, and the (100) and (101) diffraction peaks have gotten sharper. This indicates that the effect of the impregnation process on the graphitization degree was very small, but it has great influence on the size of graphite microcrystals. This is also consistent with the calculation results of the structural parameters of LG-2700 in Table S1.

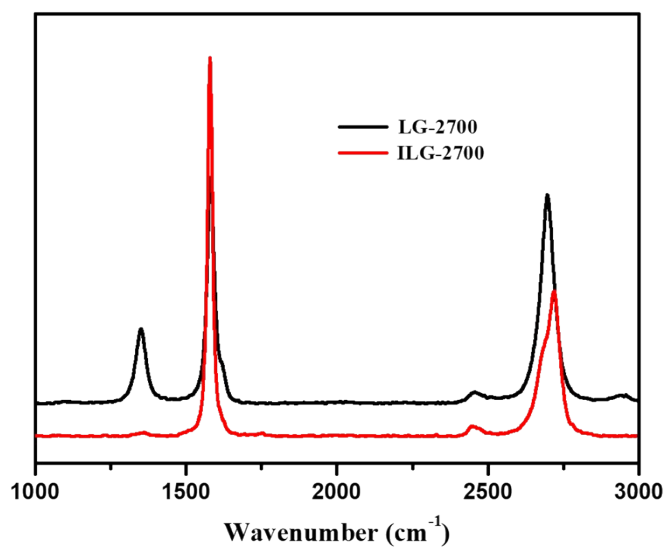


Fig. S2. Comparison of Raman spectra of LG-2700 and ILG-2700.

The following is the additional description and discussion about Fig. S2:

As can be seen from Fig. S2, the impregnation process can greatly improve the strength of G peak (ordered structure) and reduce the strength of D peak (disordered structure). This should be the synergistic result of pickling deashing and activator making the surface of raw coal more reactive.

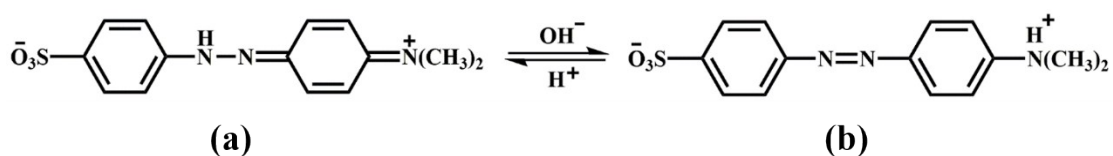


Fig. S3. The chemical structure of methyl orange in acidic conditions (a) and alkaline conditions (b).

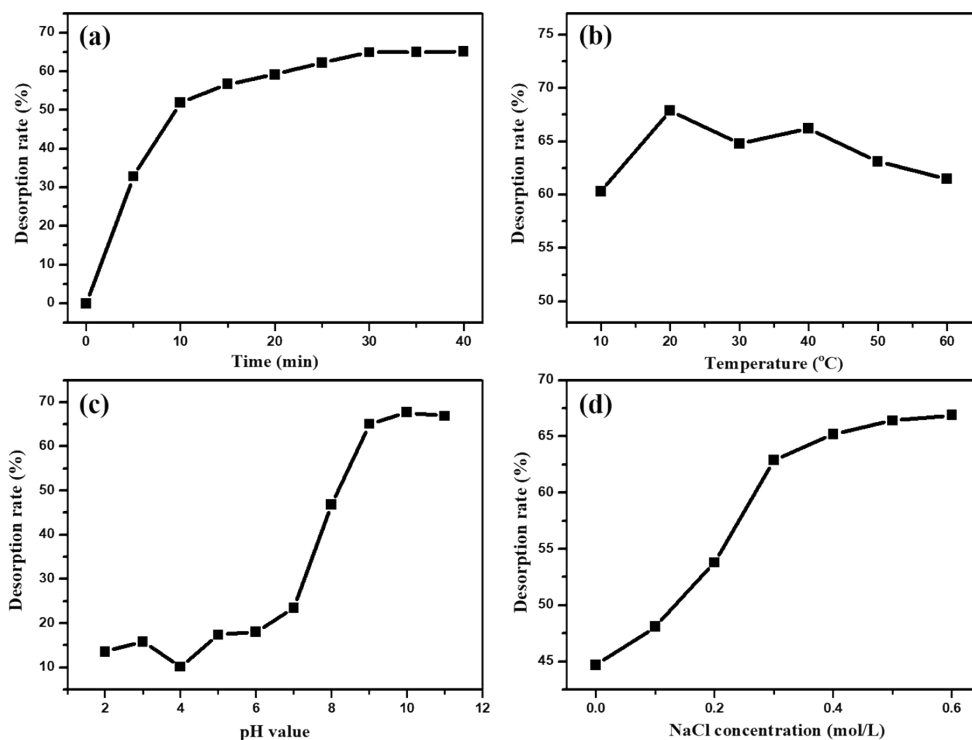


Fig. S4. Effect of desorption time (a), temperature (b), pH (c) and NaCl concentration (d) on desorption rate of methyl orange.

The following is the additional description and discussion about Fig. S4:

The desorption rate of methyl orange by ILG-2700 increased rapidly in the first 10 minutes and gradually increased with the prolongation of desorption time. After 30 minutes, the desorption rate reached equilibrium, about 65 %. The desorption rate reached 67.9 % when the temperature increased from 10 °C to 20 °C. The desorption rate decreased slowly with the further increase of temperature. In general, temperature has little effect on desorption rate. There is a close relationship between pH value and desorption rate. As the alkalinity of desorption solution increases, the desorption rate rises sharply and reaches equilibrium when the pH value is about 9. With the

concentration of NaCl increased, the desorption rate also increased, but the increase slowed down when the concentration reached 0.5mol/L. Overall, in desorption experiments, 0.5 mol/L NaCl solution with pH value of 9 was chosen as eluent, and the desorption process was carried out at room temperature.