Supplementary material (ESI) for Journal of Materials Chemistry


## Supporting Information

# A Curing Agent Method to Synthesize Ordered Mesoporous Carbons from Linear Novolac Phenolic Resin Polymers

*Yan Huang, Jianping Yang, Huaqiang Cai, Yunpu Zhai, Dan Feng, Yonghui Deng, Bo Tu, Dongyuan Zhao**

Department of Chemistry, Shanghai Key Laboratory of Molecular Catalysis and Innovative Materials, Key Laboratory of Molecular Engineering of Polymers, Laboratory of Advanced Materials, Fudan University, Shanghai 200433, P. R. China

Email: dyzhao@fudan.edu.cn

Homepage: http://homepage.fudan.edu.cn/~dyzhao/default.htm

Tel: 86-21-5163-0205; Fax: 86-21-5163-0307

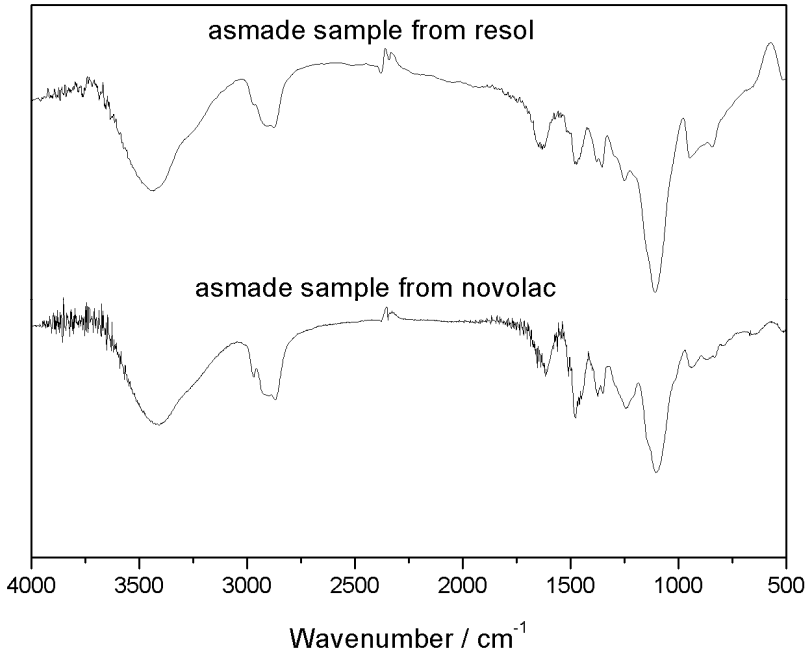


Figure S1 FT-IR spectra of as-made mesostructured phenolic resin polymers synthesized from the resol and novolac precursors.

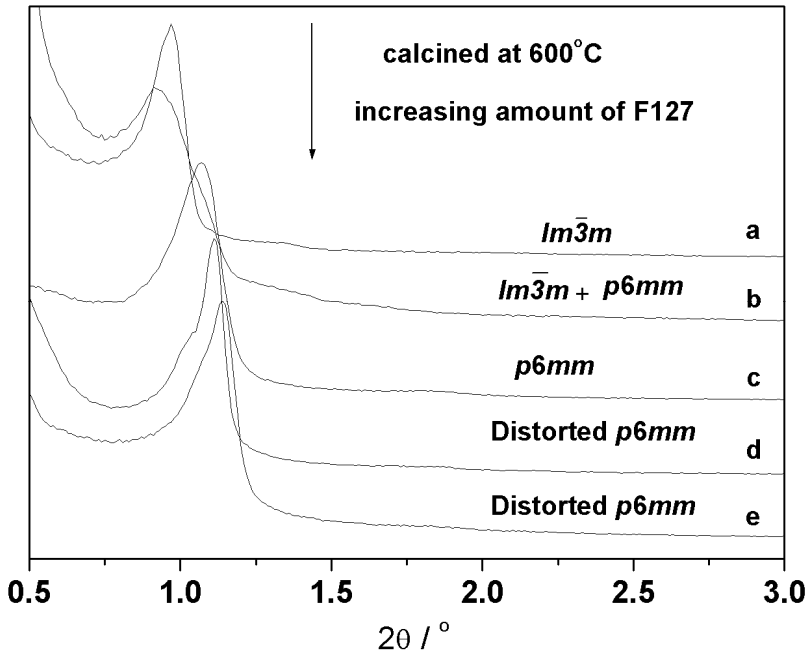


Figure S2 XRD patterns of the mesoporous carbon materials with the different molar ratio of phenol: formaldehyde: F127 = 1: 0.8: 0.0031 (a); 1: 0.8: 0.0046 (b); 1: 0.8: 0.0062 (c); 1: 0.8: 0.0077 (d) and 1: 0.8: 0.0093 (e). The mesoporous carbon samples were prepared from the curing agent method by using F127 = 1: 0.8: 0.0031; (c), as-made and (d), calcined mesoporous carbonaceous materials prepared from the HMTA curing novolac method by employing PEO-PPO-PEO F127 as a template. The calcination/carbonization was carried out in a pure nitrogen atmosphere at 600 °C for 6 h. It shows that different mesostructures of the hexagonal (*p6mm*), distorted hexagonal (*p6mm*), body-centered cubic ($Im\bar{3}m$) phases, and mixed phase (hexagonal *p6mm* + cubic $Im\bar{3}m$) can be obtained.

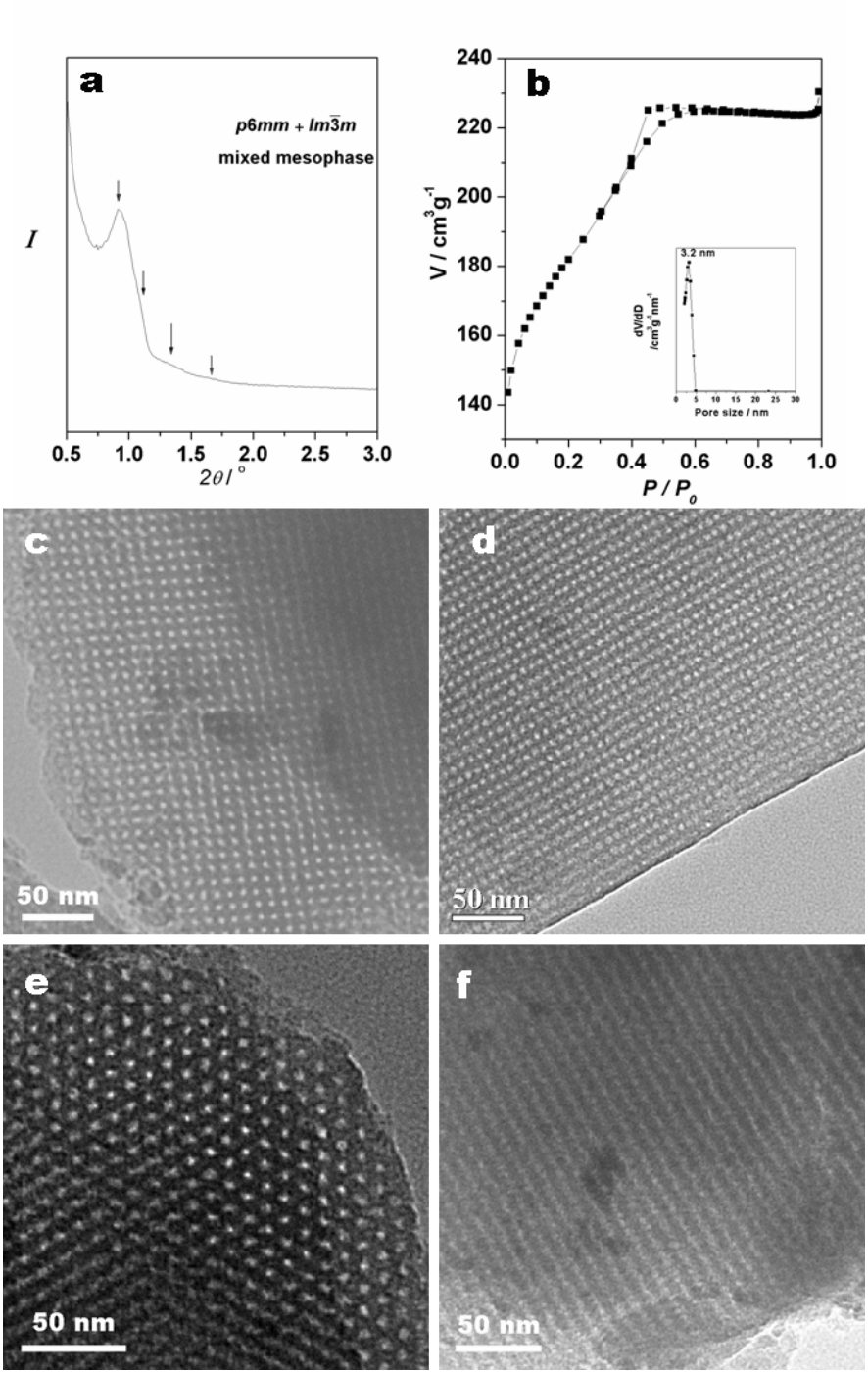


Figure S3 XRD patterns (a), $N_2$ sorption isotherms (b) with pore size distribution inset (b) and TEM images (c, d, e, f) for the mesoporous carbon with a mixed phase (body-centered cubic $Im\bar{3}m$ + hexagonal *p6mm* symmetries) The sample was prepared by using F127 as template and HMTA cured novolac as a precursor with the molar ratio of phenol: formaldehyde: F127 = 1: 0.8: 0.0046. The TEM images were taken from [100] (c) and [110] (d) [111] (e) directions, showing body-centered cubic $Im\bar{3}m$ mesophase, and [001] (e) and [110] (f) directions, showing 2-D hexagonal *p6mm* mesophase. It concluded a mixed mesophase.

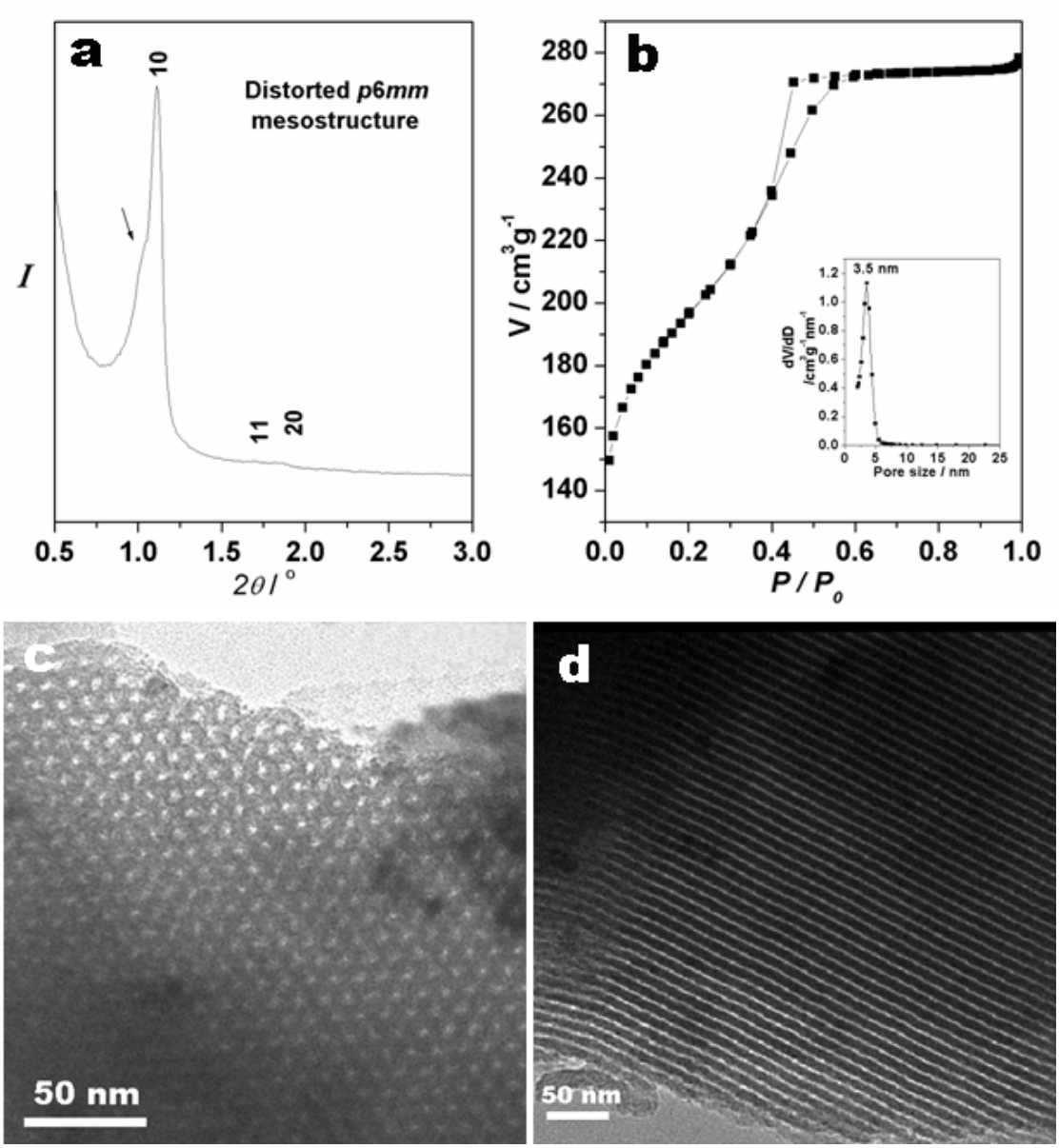


Figure S4 XRD patterns (a), $N_2$ sorption isotherms with pore size distribution inset (b) and TEM images (c, d) of the distorted 2-D hexagonal *p6mm* mesostructured sample prepared by using F127 as a template and HMTA cured novolac as a precursor with the molar ratio of phenol: formaldehyde: F127 = 1: 0.8: 0.0077. The TEM images were taken from [001] (c) and [110] (d) directions, showing the distorted hexagonal mesostructure.

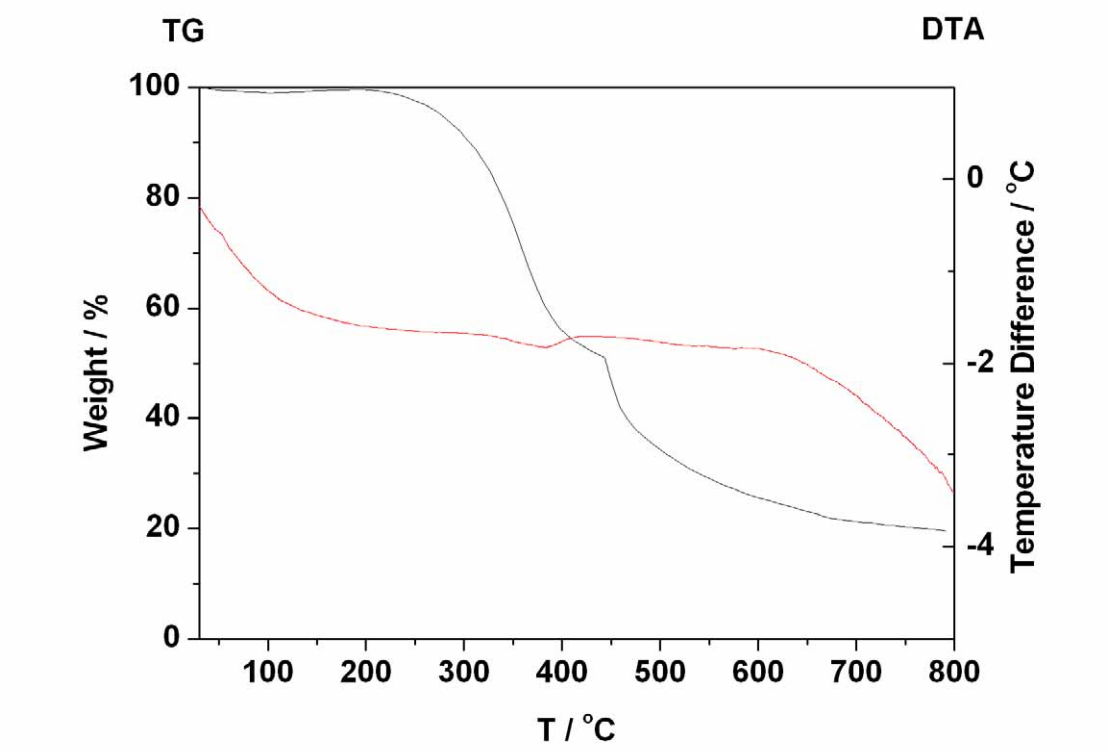


Figure S5 TG (black) and DTA (red) curves for as-made mesoporous phenolic resin polymer sample by using the HMTA cured novolac as a precursor and triblock copolymer F127 as a template with the ratio of phenol: formaldehyde: F127 = 1: 0.8: 0.0062.