Electronic Supplementary Material (ESI) for RSC Advances

Supporting Information

Using Highly Selective Mesoporous Thin Films to Sense Volatile Organic Compounds

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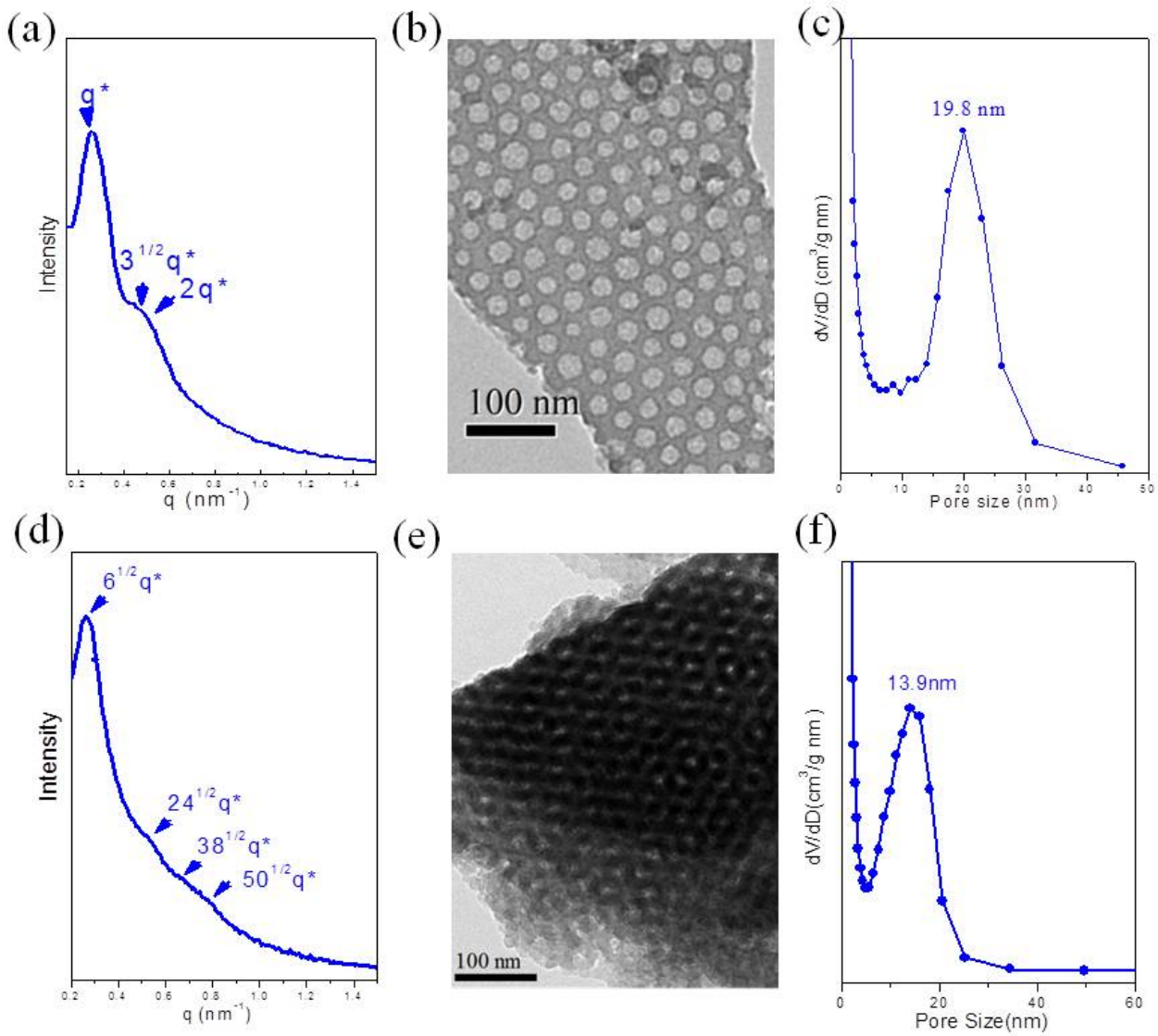

Figure S1. (a, d) SAXS data, (b, e) TEM images, and (c, f) and pore size distributions of mesoporous (a–c) silica and (d–f) phenolic resin.

Experimental detail:

Materials

Amphiphilic block copolymers PEO-*b*-PCL were prepared through the ring-opening polymerization of ε-CL and mPEG5000 in the presence of stannous octoate as the catalyst. The phenolic resin was synthesized with sulfuric acid in a condensation reaction, which produced average molecular weights (Mn = 500) that are described in previous studies. Hydrochloric acid (HCl), tetraethyl orthosilicate (TEOS), tetrahydrofuran (THF) and HMTA (all from Aldrich) were used as received.

Preparation of VOCs sensor

Firstly we deposited chromium and gold metal on the glass substrate by using sputter, then we manufactured the mask for the following exposure, developing and etching process to make the microinterdigited electrode chip. Finally the mesoporous phenolic resin sensing thin film or the mesoporous silica sensing thin film was formed on the microinterdigited electrode after the evaporation induced self-assembly (EISA) process, curing (for phenolic resin, phenolic/ = 1/1), sol-gel (for silica, TEOS/ PEO-*b*-PCL = 5/1) and further calcinations (Scheme 1a). The thickness of Cr is about 50 nm and the thickness of Au is about 200 nm on the glass substrate, furthermore. The thickness of mesoporous thin films roughly calculated by SEM section image are about 5nm.

Sensing Experiment for VOCs

After preparation of sensing chip, for beginning the measurement, we put chip into the detector chamber and exhausted the air inside until the pressure value is close to 5 torr at room temperature. Afterward, turning on the LCR Meter (WAYNE KERR LCR Meter 4235), the conditions of measurement were adjusted to frequency 10 kHz and potential 1 V. Following we injected individual organic solvent with specific concentration into the chamber to sense each time and making chamber pressure return to 1 atm with ambient air involving at the same time. Finally

monitoring and recording data by computer software for the further analysis (Scheme 1b). Repeating the the above-mentioned experimental steps for another VOC sensing.