Supplementary Material (ESI) for Journal of Materials Chemistry
This journal is (c) The Royal Society of Chemistry 2010

Cross-linked polyethylene@silica:
The first full interpenetrating network hybrid particles

Hila Elimelech* , Jean-Marie Nedelec* h,c , Adeline Hardy-Dessources h,c , Florence Babonneau d and David Avnir* a

Supplementary Information

Analytical instrumentation

Thermoporosimetry
See main text.

Solid state NMR
Measurements were performed on a Bruker AVANCE 300 spectrometer at B0 = 7 T with n0(1H) = 300.13 MHz, n0(13C) = 75.47 MHz and n0(29Si)= 59.63 MHz, using a 4 mm triple resonance Bruker MAS probe. Samples were spun at the magic angle using ZrO2 rotors (10 kHz). 29Si and 13C MAS NMR spectra were recorded with high-power {1H} decoupling (= 50 KHz) during acquisition, using 90° pulse and 100-s recycle delays. 1H spectra were obtained with 90° pulse duration and 3-s recycle delays. For CP experiments under MAS, the radio frequency field strength for 1H was ca. 50 kHz. 1H and 29Si chemical shifts were referenced to TMS.

Microscopy
High-resolution scanning electron microscopy (HR-SEM) observations were performed with a Sirion (FEI) microscope, operating at 5 kV. Samples were prepared by placing the centrifuged, air-dried powder on an aluminum stub for SEM using a double-sided carbon tape.

Particle Size Analysis
The diameter of at least 150 particles was determined by Analysis software equipped in HR-SEM. The statistical analysis was conducted using Origin software.
**Surface Area and Porosity Analysis**

BET specific surface area and BJH pore diameters were calculated from nitrogen adsorption/desorption isotherms determined at 77K using Micromeritics ASAP 2020 surface area analyzer.

**Thermal gravimetric analysis (TGA)**

These analyses were carried out with an SDTA 851e (Mettler Toledo) apparatus under air at rate 10 °C/min using STAR® software.

**Zeta-potential**

These measurements were carried out using Zetasizer Nanoseries by Malvern Instruments: The precipitate obtained by centrifugation of the emulsion was re-dispersed in 10 mM NaCl and injected into a cuvette.