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**Electronic Supplementary Information**

**Solvent- and Phase-Controlled Photochirogenesis. Enantiodifferentiating Photoisomerization of (Z)-Cyclooctene Sensitized by Cyclic Nigerosynigerose-Based Nanosponges with Pyromellitate Crosslinker**

Xueqin Wei,\textsuperscript{a} Wenting Liang,\textsuperscript{b} Wanhua Wu,\textsuperscript{a} Cheng Yang,\textsuperscript{*a} Francesco Trotta,\textsuperscript{*c} Fabrizio Caldera,\textsuperscript{c} Andrea Mele,\textsuperscript{d} Tomoyuki Nishimoto\textsuperscript{e} and Yoshihisa Inoue\textsuperscript{*f}

\textsuperscript{a} State Key Laboratory of Biotherapy, West China Medical School and Key Laboratory of Green Chemistry & Technology of Ministry of Education, College of Chemistry, Sichuan University, 29 Wangjiang Road, Chengdu 610064, China. E-mail: yangchengyc@scu.edu.cn
\textsuperscript{b} Institute of Environmental Sciences, Shanxi University, Taiyuan 030006, China
\textsuperscript{c} Department of Chemistry, University of Torino, Via P. Giuria 7, 10125 Torino, Italy. E-mail: francesco.trotta@unito.it
\textsuperscript{d} Department of Chemistry, Materials and Chemical Engineering “Giulio Natta”, Politecnico di Milano, Piazza L. Da Vinci 32, 20133 Milano, Italy
\textsuperscript{e} Hayashibara Co., 675-1 Fujisaki, Naka-ku, Okayama 702-8006, Japan
\textsuperscript{f} Department of Applied Chemistry, Osaka University, 2-1Yamada-oka, Suita 565-0871, Japan. E-mail: inoue@chem.eng.osaka-u.ac.jp

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**Elemental analysis**

Instrument: Thermo Scientific - FlashEA1112.

<table>
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<th>CNN-NS</th>
<th>Sample #</th>
<th>% N</th>
<th>% C</th>
<th>% H</th>
<th>% S</th>
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<td>3.09</td>
<td>51.36</td>
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**Discussion:** Two independent analyses of each CNN-NS gave essentially the same results, indicating the homogeneity of the polymer samples obtained. The nitrogen detected for both CNN-NSs arise from the triethylamine employed as a base in the CNN-NS synthesis, which eventually forms an ammonium salt with the carboxylic group remaining in CNN-NS. From the nitrogen contents observed (3.0-3.2%), 44% and 27% of the four carboxylic groups in pyromellitic acid are considered to form ammonium salt in CNN-NSs 6 and 7, respectively.
ATR-FTIR analysis
Instrument: PerkinElmer Spectrum 100 FT-IR.

Figure S1. ATR-FTIR spectrum of CNN-NS 6.

Figure S2. ATR-FTIR spectrum of CNN-NS 7.
Discussion: As can be seen from Figure S3, the relative intensity of carbonyl stretching band at ca. 1720 cm\(^{-1}\), against the C-O stretching band at ca. 1000 cm\(^{-1}\), is stronger by a factor of 1.5 for CNN-NS 7 (prepared by using the CNN:PDA ratio of 1:4) than for CNN-NS 6 (prepared by using the CNN:PDA ratio of 1:2), indicating the presence of a larger content of pyromellitate unit in 7.
Thermogravimetric analysis (TGA)
Instrument: TA Instruments 2050 TGA V5.4A. Program: equilibrate at 40°C, ramp 10°C/min to 700°C under nitrogen atmosphere.

Figure S4. TGA of CNN (green line) and derivative curve (blue line). Amount of adsorbed water: 11.01%.

Figure S5. TGA of CNN-NS 6 (green line) and derivative curve (blue line). Amount of adsorbed water: 8.89%.
Figure S6. TGA of CNN-NS 7 (green line) and derivative curve (blue line). Amount of adsorbed water: 6.77%

Figure S7. Comparison of TGAs for CNN-NSs 6 and 7.

Discussion: In both polymers, degradation started at 250-260°C but CNN-NS 7 gave a larger residue at 680°C than CNN-NS 6, indicating more extensive crosslinking for 7.