Electronic Supplementary Information

Hierarchical Superstructures from A Star-shaped Molecule Consisted of A Cyclic Oligosiloxane with Cyanobiphenyl Moieties

Dae-Yoon Kim,[a] Minwook Park,[a] Sang-A Lee,[a] Soeun Kim,[a] Chich-Hao Hsu,[b] Namil Kim,[c] Shiao-Wei Kuo,[d] Tae-Ho Yoon[e] and Kwang-Un Jeong*[a]

[a] Department of Polymer-Nano Science and Technology, Chonbuk National University, Jeonju, Jeonbuk, 561-756, Korea. E-mail: kujeong@jbnu.ac.kr

[b] Department of Polymer Science, The University of Akron, Akron, OH, 44325, USA

[c] Smart Materials R&D Center, Korea Automotive Technology Institute, Cheonan, Chungnam 330-912, South Korea.

[d] Department of Materials Science and Optoelectronic Engineering, National Sun Yat-Sen University, Kaohsiung 804, Taiwan.

[e] Department Materials Science and Technology, Gwangju Institute of Science and Technology, Gwangju, Jeonnam 500-712, South Korea.

Characterization data

Chemical structures and purities of SiLC and its intermediates were confirmed by thin layer chromatography (TLC), ^{1}H NMR, and ^{13}C NMR in deuterated chloroform ($CDCl_3$). All the chemical compounds synthesized in this research were purified by column chromatography using the silica gel. Chemical shifts were quoted in part per million (ppm) with a reference of tetramethylsilane (TMS). Chemical structure of compound 4-cyano-4'-hex-5-en-1-oxy-biphenyl (**1**) was confirmed by disappearance of -C-O**H** proton peak corresponding to the 4'-hydroxy-4-biphenyl-carbonitrile and appearance of -CH=C**H$_2$** of olefin group (5.03 ppm, 2H). Chemical structure of SiLC (**2**) was identified by increased integration of total protons and a new peak as -Si-C**H$_3$** (0.08 ppm, 12H) corresponding to the 2,4,6,8-tetramethylcyclotetrasiloxane. Carbon atoms of SiLC molecules were identified by both solution (Fig. S3) and solid state (Fig. 5) ^{13}C NMR and their peak position of carbon atoms were also well matched. The carbon atoms in cyanobiphenyl groups appear between 100 ppm and 170 ppm, while carbons in the alkyl chains are chemically shifted between 100 ppm and 10 ppm. Specifically, chemical shift of carbons in the cyclic siloxane ring is detected at 0 ppm.

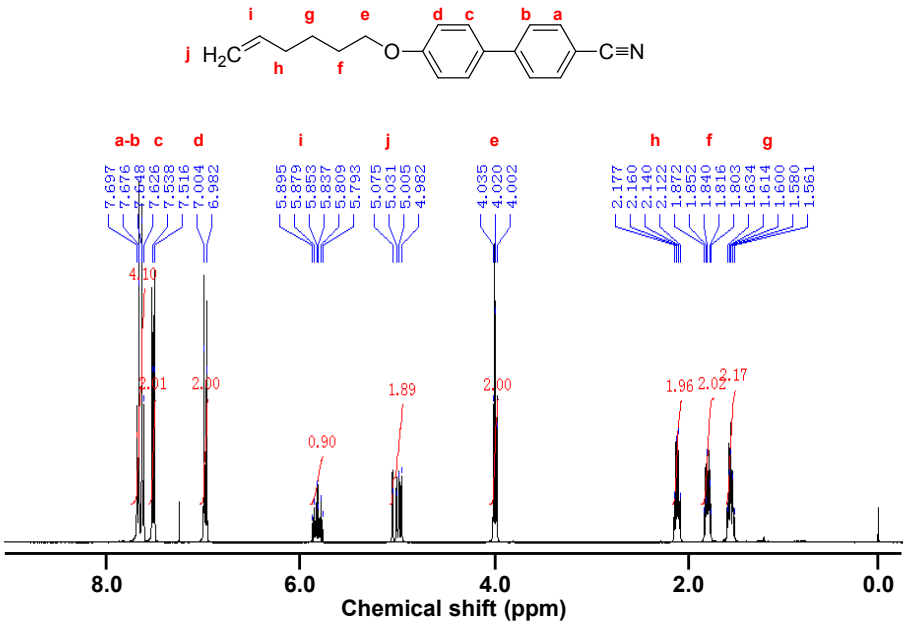

Fig. S1 ^{1}H NMR spectrum of compound **1**

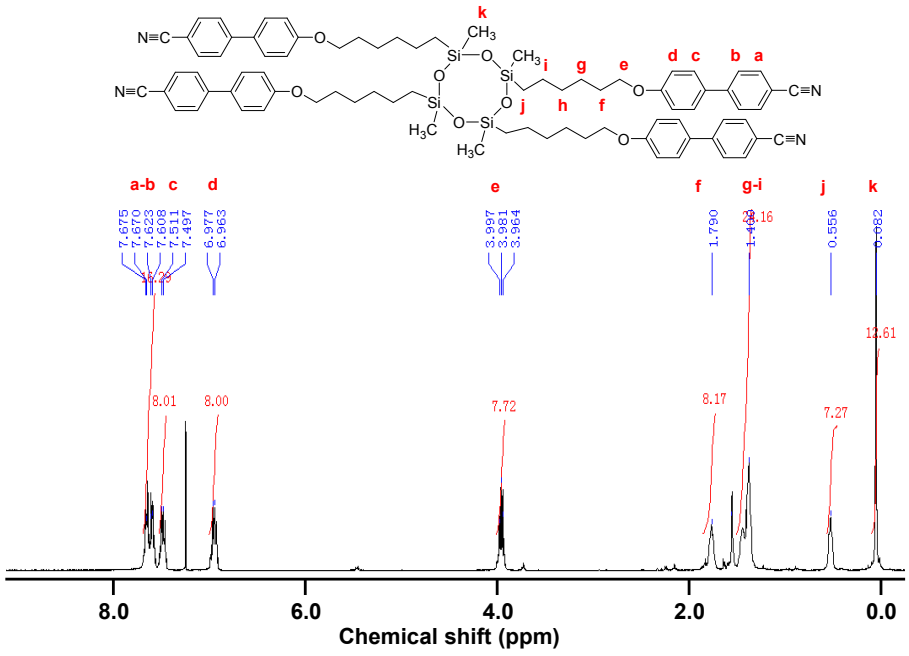

Fig. S2 ^{1}H NMR spectrum of compound **2**

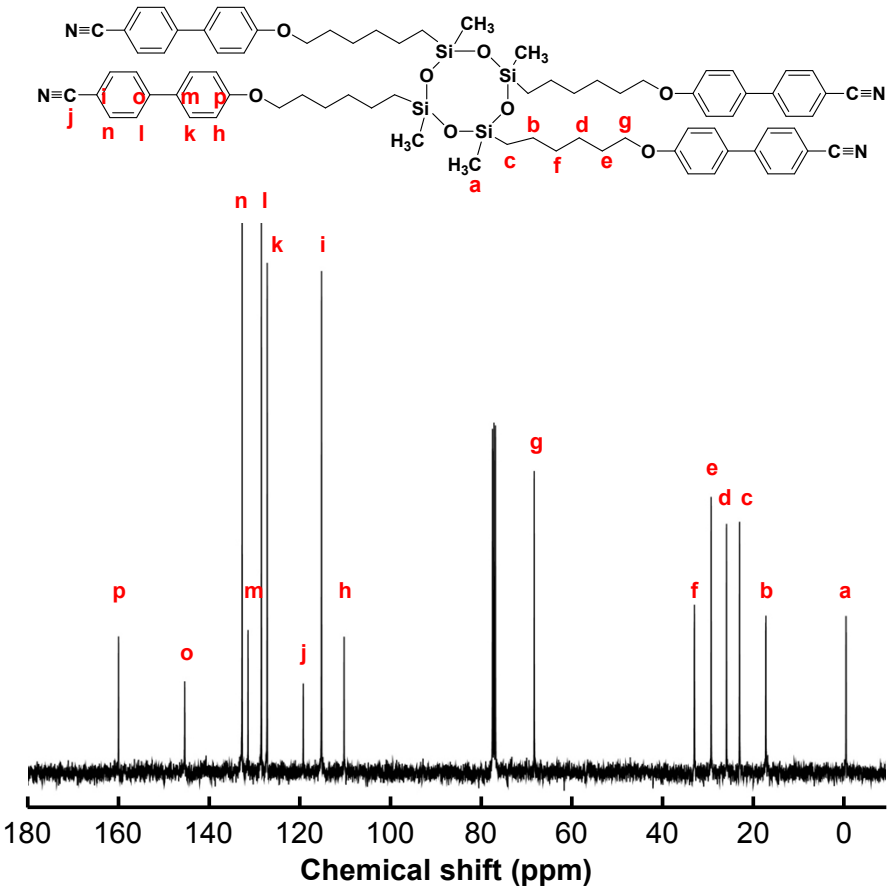

Fig. S3 ^{13}C NMR spectrum of compound **2**