This journal is © The Royal Society of Chemistry 2021

Electronic Supplementary Information

Controlled self-assembly of block copolymers in printed sub-20 nm cross-bar structures

Tae Wan Park,[ab] Young Lim Kang,[c] Myunghwan Byun,[d] Suck Won Hong,[e] Yong-Sik Ahn,[c] Junghoon Lee[f] and Woon Ik Park[c]**

[a]*Electronic Convergence Materials Division, Korea Institute of Ceramic Engineering & Technology (KICET) 101 Soho-ro, Jinju 52851, Republic of Korea.*
[b]*Department of Materials Science and Engineering, Korea University, Seoul 02841, Republic of Korea.*
[c]*Department of Materials Science and Engineering, Pukyoung National University (PKNU), 45 Yongso-ro, Nam-gu, Busan 48513, Republic of Korea.*
E-mail: thane0428@pknu.ac.kr
[d]*Department of Advanced Materials Engineering, Keimyung University, 1095 Dalgubeol-daero, Daegu 42601, Republic of Korea.*
[e]*Department of Cogno-Mechatronics Engineering, Department of Optics and Mechatronics Engineering, College of Nanoscience and Nanotechnology, Pusan National University, Busan 46241, Republic of Korea.*
[f]*Department of Metallugical Engineering, Pukyoung National University (PKNU), 45 Yongso-ro, Nam-gu, Busan 48513, Republic of Korea.*
E-mail: jlee1@pknu.ac.kr

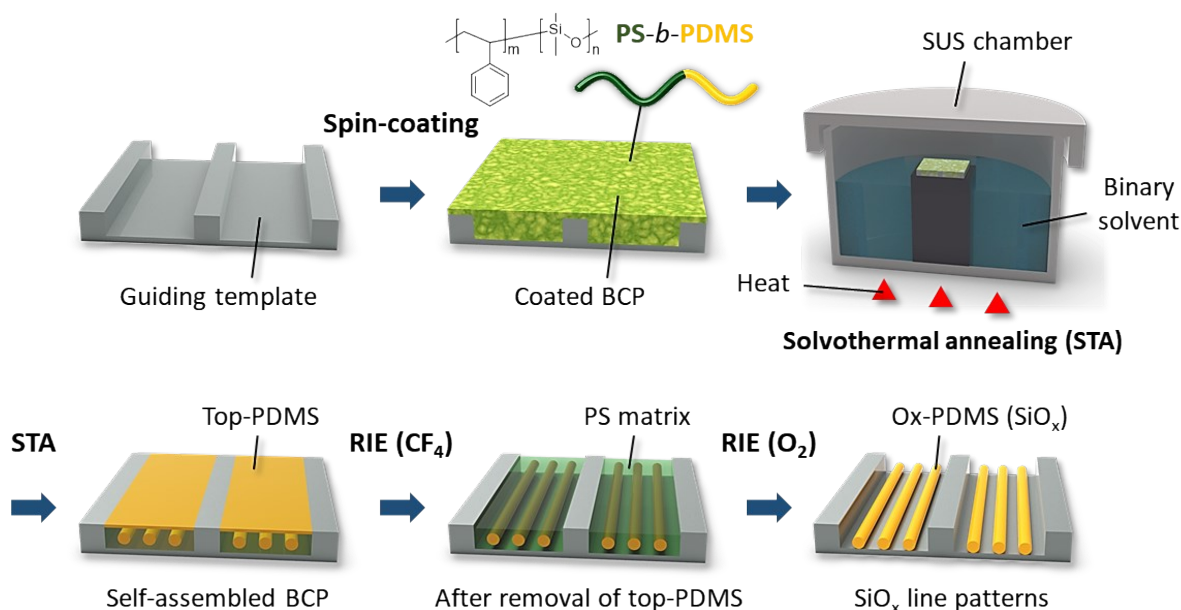

Fig. S1. Procedure for the pattern formation of sub-20 nm master mold by DSA of BCP. A cylinder-forming PS-*b*-PDMS BCP (SD45) is spin-coated on the Si guiding template fabricated by photolithography. The spin-coated SD45 thin film is annealed in a toluene at 85°C for 90 min. The highly ordered SiO_x line structures with a width of 16 nm are successfully formed within the Si guiding template after RIE etching process with CF_4 and O_2 plasma.