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Block copolymer mask with cylindrical nanochannels for wet nanopatterning on silicon wafer RYOKO WATANABE, KAORI KAMATA, TOMOKAZU IYODA, Division of Integrated Molecular Engineering, Chem. Res. Lab., Tokyo Institute of Technology — Microphase-separated structure of block copolymer (BC) thin film has been considered as a mass-productive nanomask, in which the periodicity of the pattern can be tuned by molecular weight. We have developed a series of amphiphilic BC, PEO$_m$*b*-PMA(Az)$_n$, consisting of hydrophilic, ion-conductive poly(ethylene oxide) (PEO) and hydrophobic poly(methacrylate) with azobenzene in its side chain. This BC forms hexagonally arranged PEO cylinders which span across the thickness of the film after thermal annealing. In this study, PEO cylinders were blended with poly(ethylene glycol) monomethylether to provide effective nanochannels that can perpendicularly diffuse etching species for wet etching of silicon wafer As a quick and total wet nanopatterning process, a silicon wafer covered by the BC mask was annealed at 140 degrees C for 1 h and immersed into 33 wt% NH_4F aqueous solution for 3 min. AFM observation of the resulting silicon wafer surface revealed a hexagonally arranged nanohole array with 24 nm of center-to-center distance and 10 nm of diameter was fabricated.

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