

## **Fabrication of Nanostructured Arrays Using Si-Containing Block Copolymer and Dually Responsive Photoresist**

**Authors :** Kyoungok Jung, Chang Hong Bak, Gyeong Cheon Jo, Jin-Baek Kim

**Abstract :** Nanostructured arrays have drawn extensive attention because of their unique properties resulting from nanoscale features. However, it is difficult to achieve uniform and freestanding 1D nanostructures over a large area. Here, a simple and novel method was developed for fabrication of universal nanoporous templates for high-density nanostructure arrays, by combining self-assembly of a Si-containing block copolymer with a bilayer lithography system. We introduced a dually responsive photoresist bottom layer into which the nanopatterns of block copolymer are transferred by oxygen reactive ion etching. Because the dually responsive layer becomes cross-linked by heating, it can be used as a hard template during the etching process. It becomes soluble again by chain scission upon exposure to light. Therefore, it can be easily removed by the lift-off process. The template was applicable to the various conducting substrates due to the compatibility of the photoresist with a wide range of substrates and was used in electrodeposition for well-aligned and high-density inorganic and organic nanoarrays. We successfully obtained vertically aligned and highly ordered gold nanorods and polypyrrole dots on the substrate without aggregation, and these arrays did not collapse after removing the dually responsive templates by the simple lift-off process.

**Keywords :** block copolymer, dually responsive, nanostructure, photoresist

**Conference Title :** ICNOP 2015 : International Conference on Nanotechnology, Optoelectronics and Photonics

**Conference Location :** Kyoto, Japan

**Conference Dates :** November 12-13, 2015