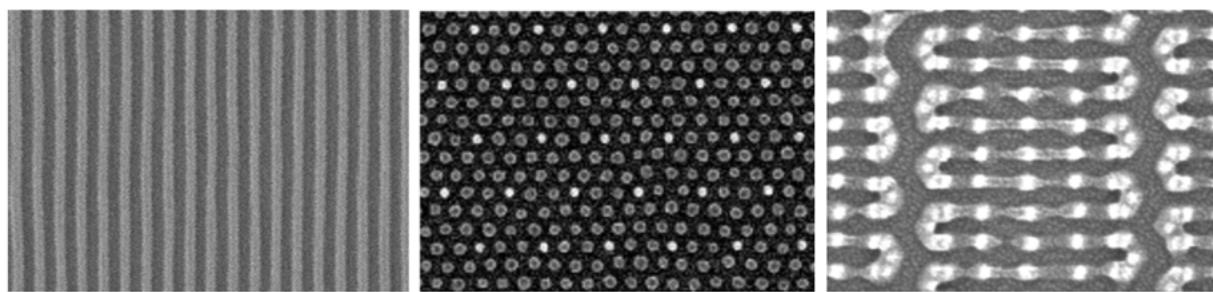


## Self-assembly of Si-containing block copolymers for next-generation nanofabrication

### 정연식

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As device dimensions shrink, it is increasingly important to develop fabrication methods that can create sub-15 nm features of regular or arbitrary geometry in a rapid, parallel, and efficient process. This talk will discuss approaches based on self-assembling hybrid polymers containing Si. The thin films of those materials systems can generate well-ordered periodic arrays of dots or lines. For achieving, long-range ordering, it is helpful to use lithographically-defined templates, which are in general much larger than the length-scale of self-assembled nanostructures. For example, the self-assembly of polymer nanostructures can easily be templated using an array of nanoscale topographical elements that act as guiding templates or surrogates for one of two microdomains. The solvent-vapor-induced tunability of pattern dimension and morphology will be discussed as well. Those material systems can excellently serve for high-precision self-assembly that can provide good resolution, reliability, and controllability and be considered as an option for a future nanomanufacturing technology.



**Figure 1.** Various kinds of silica nanopatterns prepared with Si-containing block copolymers.

### References

1. Jung, Y. S.; Ross, C. A. *Nano Letters* 2007, 7, 2046-2050.
2. Bita, I.; Yang, J. K. W.; Jung, Y. S.; Ross, C. A.; Thomas, E. L.; Berggren, K. K. *Science* 2008, 321, 939-943.

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3. Jung, Y. S.; Jung, W.; Ross, C. A. *Nano Letters*. 2008, 8, 2975-2981.
  4. Jung, Y. S.; Jung, W.; Tuller, H. L.; Ross, C. A. *Nano Letters* 2008, 8, 3776-3780.
  5. Jung, Y. S.; Ross, C. A. *Advanced Materials* 2009, 21, 2540-2545.
  6. Yang, J. K. W.; Jung, Y. S.; Chang, J.-B.; Mickiewicz, R. A.; Alexander Katz, A.; Ross, C. A.; Berggren, K. K. *Nature Nanotechnology* 2010, 5, 256-260.
  7. Jung, Y. S.; Chang, J. B.; Verploegen, E.; Berggren, K. K.; Ross, C. A. *Nano Letters* 2010, 10, 1000-1005.
  8. Liang, X. G.; Chen, T.; Jung, Y. S.; Miyamoto, Y.; Han, G.; Cabrini, S.; Ma, B. W.; Olynick, D. L. *ACS Nano* 2010, 4, 2627-2634.
  9. Liang, X. G.; Jung, Y. S.; Wu, S. W.; Ismach, A.; Olynick, D. L.; Cabrini, S.; Bokor, J. *Nano Letters* 2010, 10, 2454-2460.

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