Holographic fabrication of functional nanostructures for efficient sensing applications

Sung-Gyu Park

Advanced Functional Thin Films Department

Korea Institute of Materials Science

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KIMS 재료연구소 Korea Institute of Materials Science

Holographic Lithography (Multi-beam Interference Lithography)

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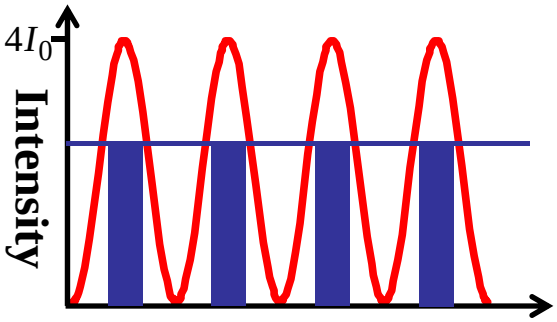
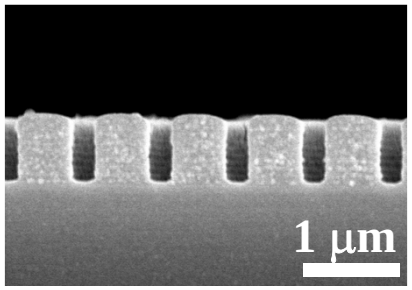
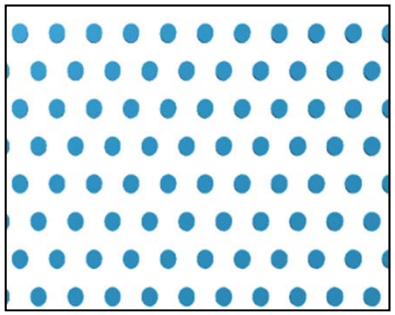
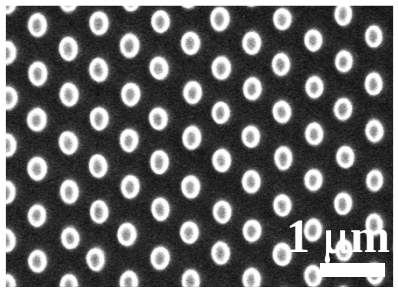
2 beam HL



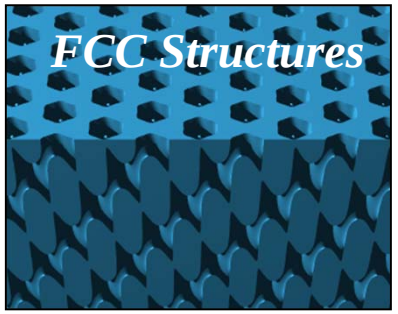


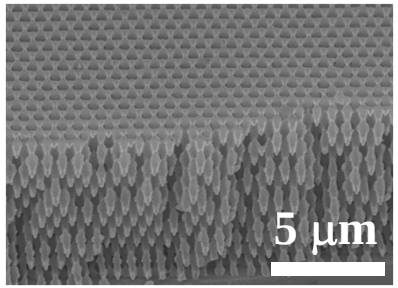
3 beam HL



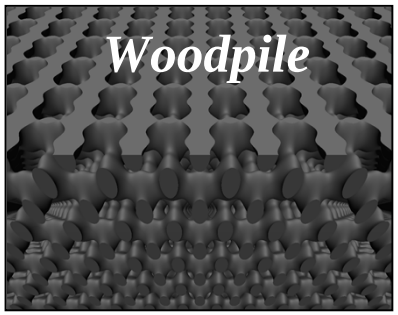


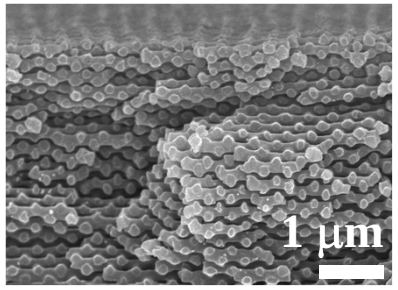
4 beam HL





5 beam HL





Holographic Intensity Profile

$$I = \sum_i \vec{E}^2 + \sum_{i<j} \vec{E}_i \cdot \vec{E}_j \cos\left[(\vec{k}_i - \vec{k}_j)\cdot\vec{r} + (\varphi_i - \varphi_j)\right]$$

Pattern Contrast Lattice Symmetry Pattern Shift

Optical Setup and Experiments

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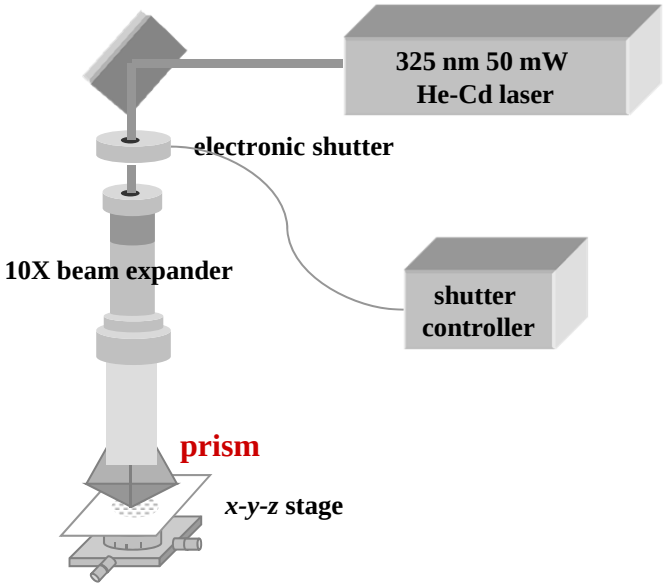
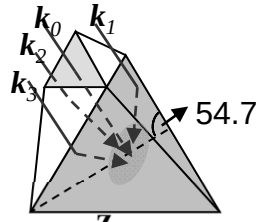
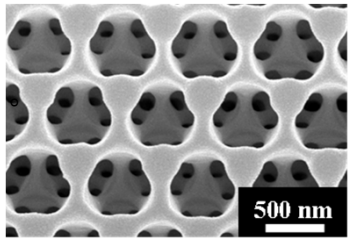
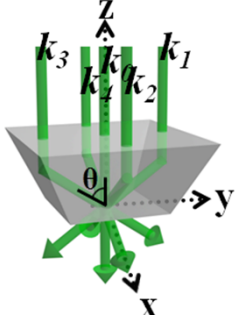
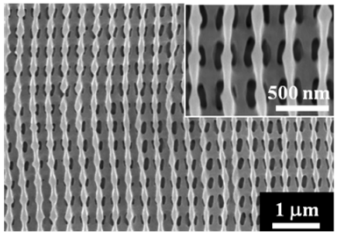
Optical Setup for Prism HL



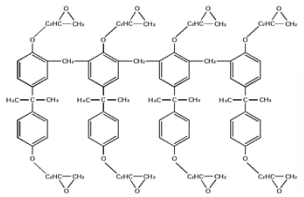


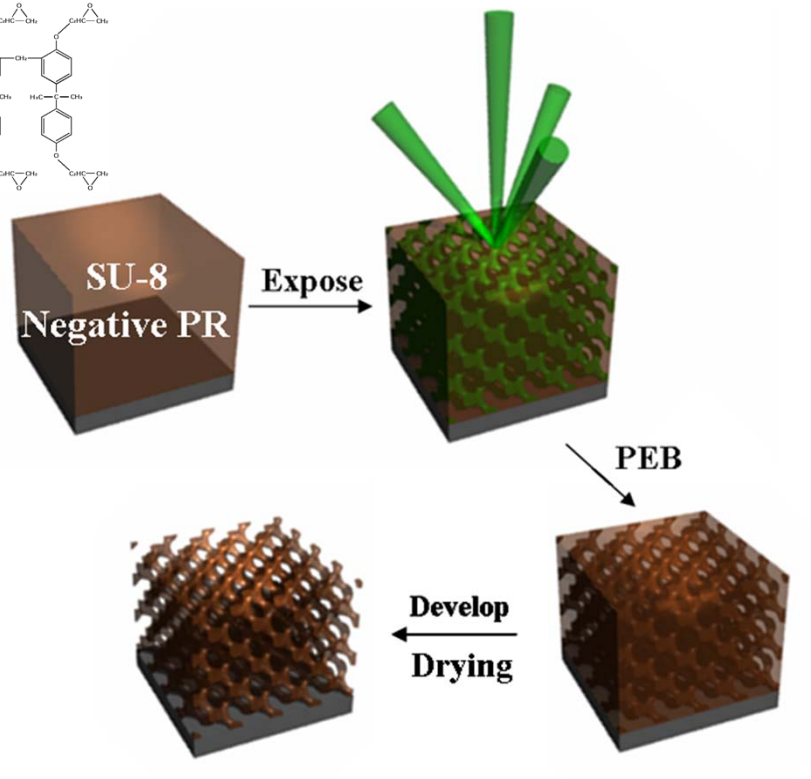






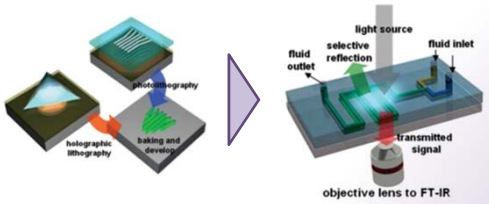
Experimental Procedure

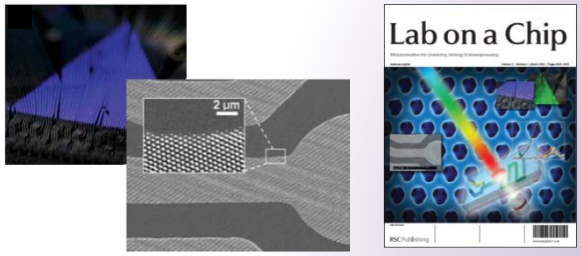




Holographic Lithography

3D Photonic Crystals

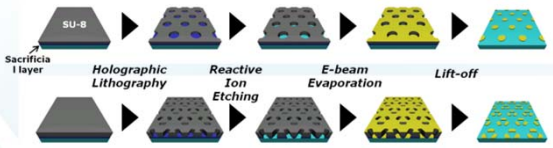


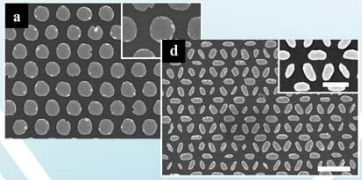


Integration of PCs into Microfluidic Devices for RI sensing device

Lab Chip

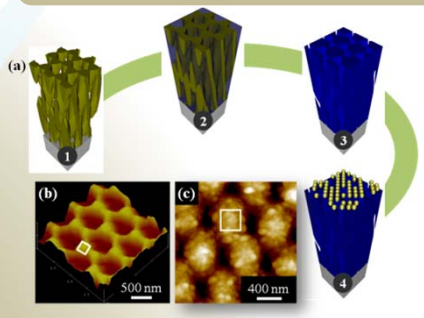
2D Metallic Nanostructures



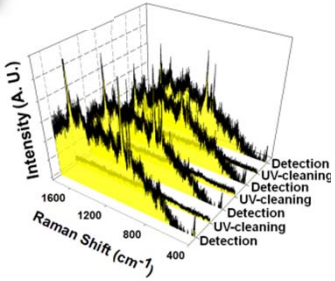


Chemical / Bio sensor using SPR or SERS signals

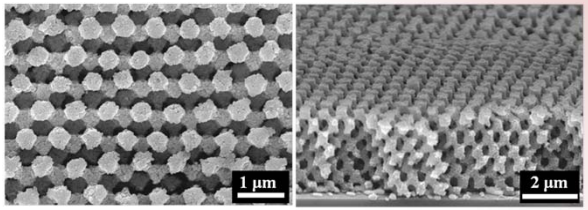
Reusable 3D SERS Substrates



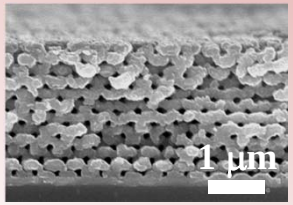
UV-assisted Photocatalytic Degradation of Absorbates by ZnO



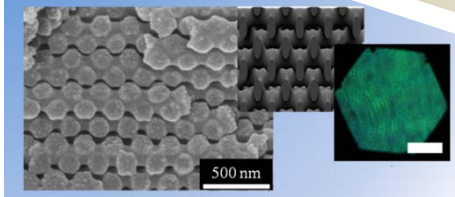
3D Semiconductor Structures



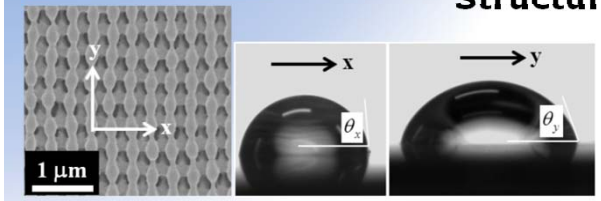
TiO_2 Inverse FCC Structures



Cu_2O Inverse Woodpile Structures



Smallest Woodpile Structures



Anisotropic Wetting Control

Nanoscale

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