Abstract Submitted
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Ultrasmall Silver Nanopores Fabricated by Femtosecond Laser Pulses[1] JIMIN ZHAO, F. BIAN, Y.C. TIAN, R. WANG, H.X. YANG, Institute of Physics, Chinese Academy of Sciences, HONGXING XU, Institute of Physics, CAS; Lund University, SHENG MENG, Institute of Physics, Chinese Academy of Sciences — Ultrasmall nanopores in silver thin films with a diameter of about 2 nm have been fabricated using femtosecond laser ablation in liquid [1]. Ultrafast laser pulse ablation generates highly nonequilibrium excited states, from which silver thin films emerge and progressively grow with the assistance of capping agent molecules. During this growth process, capping agent molecules are enclaves within the film, leaving individual ultrasmall pores in the thin film. Our first-principles calculations show that the pore size is critically determined by the dimension of the confined molecules. Furthermore, by using smaller capping agent molecules, we were able to fabricate smaller nanopores with 1.6nm diameter. Our approach advances the capability of optical methods in making nanoscale structures with potential applications in areas such as near-field aperture probes, imaging masks, magnetic plasmonic resonances, and biosensing with individual nanopores.

[1] F. Bian, Y. C. Tian, R. Wang, H. X. Yang, H. X. Xu, Sheng Meng, and Jimin Zhao, *Ultrasmall Silver Nanopores Fabricated by Femtosecond Laser Pulses*, Nano Lett. **11**, 3251–3257 (2011).

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