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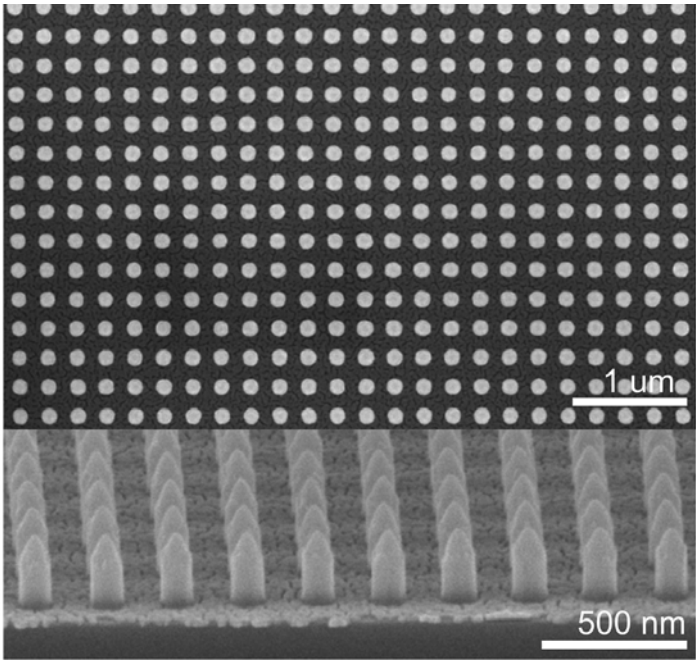
Nanostructuring News

Newsletter of EULITHA AG

Large-Area Noble Metal Nanoparticle Arrays for Catalysis and Sensing

A recent article published in Nature Microsystems and Nanoengineering by researchers at the University of Twente tackles the challenge of fabricating large-area periodic arrays of noble metal nanoparticles. Such arrays are promising systems for many applications in sensing and catalysis due to their localized surface plasmon resonance and size related chemical and catalytic properties. However, fabricating uniform arrays over large areas is a great challenge due to the limitations of current lithography and self-assembly technologies. Researchers at the University of Twente have combined Displacement Talbot Lithography exposures on their PhableR 100 system with innovative dry etching techniques to obtain gold and platinum nano-particle arrays supported on silica substrates. The arrays contained more than 10^{10} particles that measured less than 20 nm in size. Their method of dry etching and annealing has dramatically improved the adhesion of the particles on their silica support, which is one of the biggest difficulties in the fabrication of noble metal nano structures. The produced arrays are expected to find applications in trace element detection, dopamine sensing, protein and cell surface analysis and to serve as model systems for catalytic activity by nanoparticles.

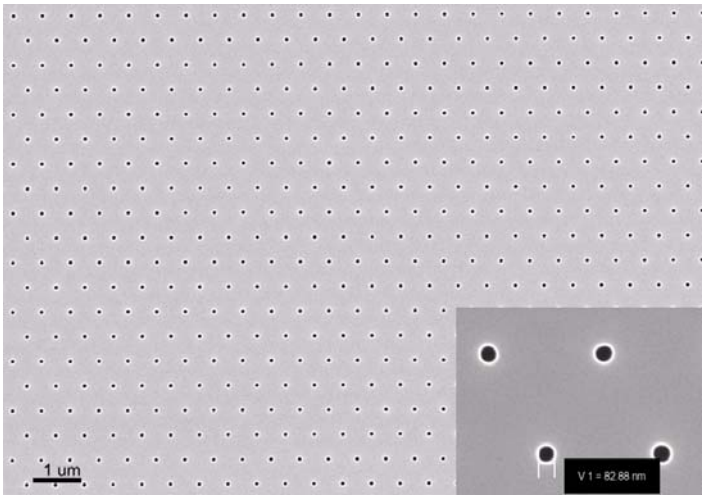
For more information please see Le-The et al. Microsystems & Nanoengineering (2018) 4:4.



Lund University to Develop Nanowire Devices on PhableR 100 DUV System

New, efficient, colored LEDs for displays, photovoltaic cells, semiconductor lasers, bio-sensors are just some of the devices that can benefit greatly from the development of semiconductor nanowires. Lund University of Sweden is at the forefront of research in this field having already spun off a number of companies leading the global commercialization efforts. In many cases, nanowires are grown on patterned templates, such as an array of holes etched in a substrate surface, to ensure uniform growth and device properties. The required growth templates need to be patterned by high resolution lithography, often with feature dimensions below 100 nm. The PhableR 100 DUV system operating with an ArF excimer source offers an advantageous solution to this challenging problem. Researchers from Lund University have decided to take advantage of this unique capability. The system is scheduled to be installed at the cleanroom of the university in the summer months.
Dr. Maria Huffman, Director of Lund Nano Lab says “This equipment will let us address the feature size range of 90-100 nm, which makes it very attractive to all nanowire growers within the research community, in particular those working on LED and solar cell development. One key advantage is the fact that this is a non-contact technique, perfectly suitable for sensitive substrates.”

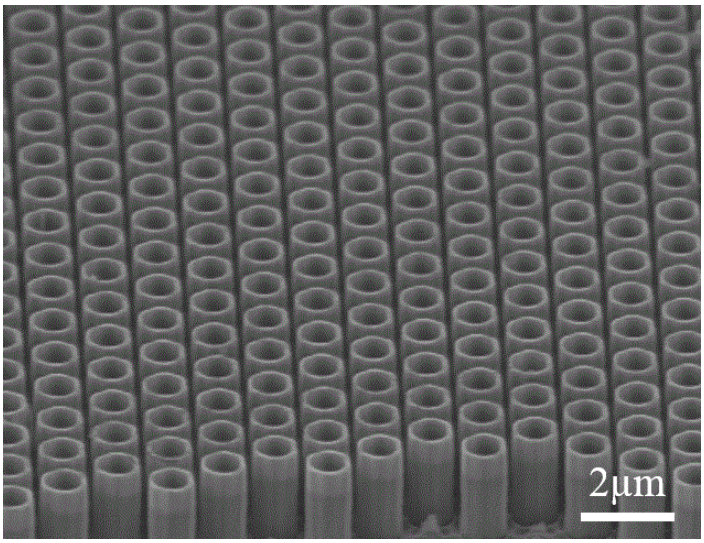
Read our press release



Nanotube Optical Cavities with Displacement Talbot Lithography

Researchers at the University of Bath have demonstrated a novel use of the DTL method on their PhableR 100 system to produce InGaN/GaN nano-tube arrays with unique optical properties. Ring-shaped structures in photoresist were first obtained by controlling the exposure dose in a DTL exposure of a hexagonal array. The rings were then dry etched into the underlying InGaN/GaN layers to form high aspect-ratio tubes measuring only 100-150 nm in wall thickness and 850 nm in inner diameter. Optical characterization supported by simulation results indicate that the tubes act as optical micro-cavities supporting Fabry-Perot modes along the axial direction and whispering gallery modes in the orthogonal plane. The results show the feasibility of low-cost, fast and large-scale fabrication of tube arrays with the DTL method combined with dry etching. The technique opens new possibilities for production of novel nano-LED and nano-laser structures along with bio-chemical sensing applications.

The work was published by P. –M. Coulon and co-authors in Optics Express (Optical properties and resonant cavity modes in axial InGaN/GaN nanotube microcavities, www.doi.org/10.1364/OE.25.028246).



DUV Exposure Services at Eulitha

Eulitha has recently increased its processing capacity based on customer demand for its high resolution patterning services. Applications like Distributed Feedback (DFB) Lasers, Wire-Grid Polarizers (WGP) and anti-reflective (AR) structures benefit from resolution going down to 60 nm (line/space). Eulitha can process customer wafers or provide high-resolution patterns on silicon or fused silica substrates.
For a current list of available standard patterns please refer to our website. Custom patterns are available upon request.

Please contact us with your requirements.

Eulitha's PhableR 100 System through the Camera of a Researcher

We fell in love with the new video produced by our colleagues at Twente University.
See it for yourself as they explain step-by-step how easy it is to create large area nanostructures with the PhableR 100 system. Many thanks to the team at the NanoLab in Twente!

Meet us at

China International Optoelectronic Exposition 2018
Shenzhen, China
September 5-8, 2018

MNE 2018
Copenhagen, Denmark
September 24-27, 2018

Photonics West 2019
San Francisco, California, United States
February 2-7, 2019

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