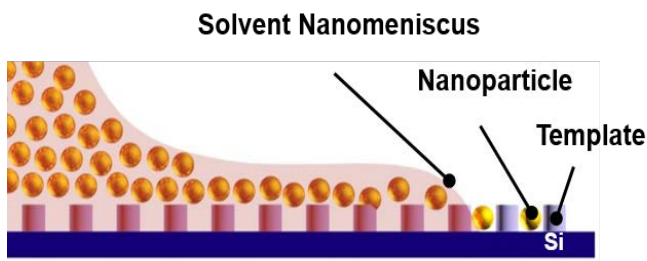


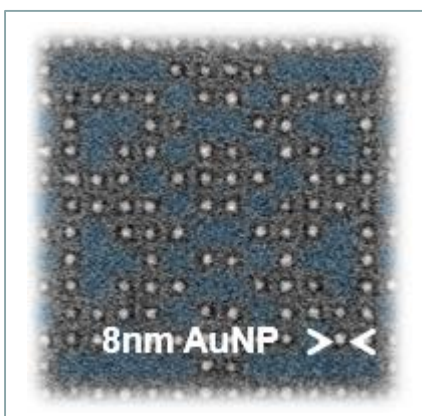


About the Technology

- IMRE developed a high resolution nano-patterning process that combines top-down and bottom-up patterning techniques to fabricate colloidal nanoparticle-based nanostructures.
- The process involves the directed self-assembly of nanoparticles (DSA-n) which allows for the direct integration of nanoparticles made of functional materials (e.g. quantum dots) into structures for incorporation into devices.
- The functional materials are able to react to light or electrical excitations without the need for further fabrication processes.
- This cost-effective patterning solution produces high resolutions of sub-10 nm length scales.



¹A schematic illustration of nanoparticles deposition process within pre-patterned nanostructures using capillary forces.



²Scanning electron micrograph image showing single 8 nm gold nanoparticles trapped within hydrogen silsesquioxane (HSQ) cavities.

Addressing...

- costly and tedious nanofabrication processes
- the limited level of resolution using lithography techniques

Potential Applications

- Photonics devices with resolutions beyond lithography limits, e.g. single electron transistors and LEDs

Collaboration Opportunities

- Integrate nanoparticles into optoelectronics circuits
- Develop single particle charge memories for high density data storage
- Integrate colloidal nano-particles into nano-structures for enhanced sensing

References:

- ¹Asbahi M, Wang FK, Dong ZG, Yang JKW, Chong KSL. Directed self-assembly of sub-10nm particle clusters using topographical templates. *Nanotechnology*. 2016;27(42):6
- ²Asbahi M, Mehraeen S, Wang F, Yakovlev N, Chong KSL, Cao J, et al. Large Area Directed Self-Assembly of Sub-10 nm Particles with Single Particle Positioning Resolution. *Nano Letters*. 2015;15(9):6066-70



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