

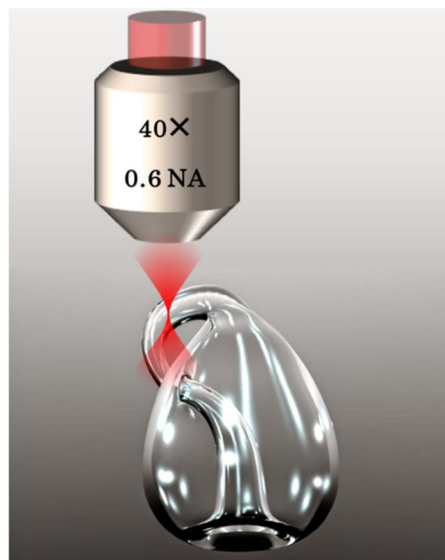
Micro Cages by Holographic Photofabrication

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We propose to develop a methodology in order to setup an agile way to fabricate hollow micro-structures. All microfabrication techniques suffer from this topological constraint : the difficulty to fabricate hollow shapes. Whether using additive manufacturing or machining (cutting), it is impossible in general to fabricate 3D heterogeneous structures at the micrometer scale in a one-step process. Using two steps fabrication process is possible though technically demanding and then expensive.

We propose to combine microscopic holography, and two different additive photo-fabrication techniques (photo-polymerisation and photo-grafting) to set up an agile platform allowing to fabricate hollow microcages. This platform will be useful for designing microstructures for different physics domains like micro-mechanics of membranes or chemistry of few molecules. For micro-acoustic application, we propose to prove experimentally that trapping a closed volume of gas under a thin membrane enhances the displacement sensitivity of the membrane with respect to surrounding acoustic waves. For physico-chemistry we propose a repeatable methodology for trapping unique nano-object in μL volumes of solutions. In such traps, the influences of diffusion and reactivity of species can be more easily decoupled.

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Vue d'artiste : photo-fabrication de micro-objets de topologies complexes