Nanostructures Technology, Research and Applications

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1. Nanostructures Laboratory

The NanoStructures Laboratory (NSL) at MIT develops techniques for fabricating surface structures with feature sizes in the range from nanometers to micrometers, and uses these structures in a variety of research projects. The NSL is closely coupled to the Space Nanotechnology Laboratory (SNL) with which it shares facilities and a variety of joint programs. The NSL and SNL include facilities for lithography (photo, interferometric, electron-beam, imprint, and x-ray), etching (chemical, plasma and reactive-ion), liftoff, electroplating, sputter deposition, and e-beam evaporation. Much of the equipment, and nearly all of the methods, utilized in the NSL/SNL are developed in house. Generally, commercial lithography and processing equipment, designed for the semiconductor industry, cannot achieve the resolution needed for nanofabrication, is inordinately expensive, and lacks the required flexibility for our research. The research projects within the NSL/SNL fall into four major categories: (1) development of nanostructure fabrication technology; (2) nanoelectronics, nanomagnetics and microphotonics; (3) periodic structures for x-ray optics, spectroscopy, atomic interferometry and nanometer metrology; (4) building a bridge to macromolecular assembly and 3-dimensional structures via surface templating and membrane folding.