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, 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 microphotonic;
(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.