Non-Confidential Description - PSU No. 2368
“Chemical Functionalization Nanolithography”

Keywords:
nanotechnology, electron beam, functionalization, lithography

Links:
U.S. Patent #6,835,534
Inventor Website

Inventors:
Raymond Funk, Paul Weiss

Background
Nanoscale structures drive most optoelectronic and plasmonic devices. A popular method for fabricating such devices is electron beam lithography. Nanoscale structures fabricated per this method are often merged due to poor resolution, yielding structures different from those intended. However, this invention reduces such merging by locally functionalizing a substrate with molecules, allowing “targeted” lithography.

Invention Description
This invention describes devices and methods for patterning substrates by chemical functionalization. A substrate is covered with a monolayer of molecules. At least one chemical bond internal to each molecule is functionalized by exposure-induced methods (e.g., electronic or photonic cascade; thermal flux). The substrates on which the molecules are patterned can be nanocomposites. Upon functionalization, methods of fabricating devices from the functionalized substrates include photolithography, electron beam lithography, and scanning electron microscopy.

Advantages/Applications
- Improved resolution when fabricating structures at nanometer scales
- Manifold methods of fabrication