

## **Electron Beam Lithography**

Electron beam lithography (EBL) of eLINE Plus Raith, Germany, is a nanofabrication technique used to pattern nanostructures/nanolithography. The technique consists of scanning a beam of electrons on the sample coated with a resist which is sensitive to electron beam. The chamber vacuum ( $10^{-7}$  mbar) and the gun vacuum ( $10^{-9}$  mbar) are needed to operate the machine. High vacuum pressure is achieved using turbo pump and ion getter pump. Tungsten is used as the field emission electron source. The beam energy can be varied from 1 to 30 keV with aperture varying from 30 to 120  $\mu\text{m}$ . The positive resist used for the EBL is polymethyl methacrylate (PMMA) and the negative resist is hydrogen silsesquioxane (HSQ). The resolution of the pattern gets affected by many parameters such as resist thickness, exposure dose and electron beam energy. The feature size of 50 nm or more can be achieved using positive resist PMMA. HSQ uses as a negative resist for patterning feature size less than 50 nm.