

Designing of masks for quantum dot single electron transistor fabrication using E-beam nanolithography

Quantum dot single electron transistor (QD SET) is able to be fabricated through a joint technique of e-beam lithography (EBL), pattern dependent oxidation (PADOX) and high density plasma etching. In this research, we have fabricated amount of masks for preliminary works in preparation of single electron transistor design. In detail, one of them is mask for doped area separator and others are for formation of source-QD-drain, poly-Si gate, point contact and metal pad. They all are designed using GDSII Editor software offline and then exposed using SEM based EBL. In this paper, we demonstrate all of patterned masks and their nanostructures of SEM and atomic force microscopy (AFM). Shape and dimension biases of schematics and SEM images are found where it is accused by proximity effect, design dimension and inaccurately plane of focus.