ION-INDUCED TRIANGULAR FEATURES SUPERIMPOSED BY NANORIPPLES OF SILICON (001)

Irradiation of silicon surfaces with low energy ions with Argon ions at oblique incidence results in formation of triangular features with elevations and depressions superimposed by nanoripples [1, 2]. These triangular features depend on ion beam irradiation parameters such as ion species, ion energy, angle of incidence and fluence. In this work, we report on the investigation about the ion-induced triangular features on silicon surfaces varying the ion energy, angle of incidence and ion fluence. Triangular features start evolving after 200 eV energy leading to well enhanced features at 300eV and with increase in energy the lateral length of these features increases from 160 nm at 300 eV to 450 nm at 500 eV. These features don't appear when the energy exceeds 500 eV. Also they appear in two categories: elevations and depressions. It was found that there is more number of elevations than depressions when angle of incidence was varied and this number increases up to 67o and decreases after this. As reported by Loew et al. in 2019 [3], dispersion is the responsible mechanism for the formation of triangular features on ripple patterns which is confirmed in our experiments by varying the ion fluence. With increase in the ion fluence, the lateral length of the triangular features increases with the constant base angle. This is also found for all the ion energies studied here i.e. 200 - 500 eV. These triangular features can be described by modified AKS equation. Simulations are performed using this modified equation by Loew and