

3 - 20 Comparison of Grazing and Normal Incidences on the Shape of Nanostructures by Highly Charged Ions Impact on Single Crystal Surfaces

Wang Yuyu, Cheng Rui, Zhou Xianming, Sun Jianrong, Wang Zhiguang and Xiao Guoqing

Highly charged ions (HCI) in the MeV energy regime are able to induce surface modifications on a nanometric scale^[1]. These modifications result from the deposition of potential energy carried by HCI in the topmost surface layers and from electronic energy loss of ions along its trajectory. An additive effect between depositions of kinetic energy and potential energy for surface nanostructure formation on CaF_2 has been studied recently^[2].

We have extensively studied the surface modification on different single crystal surfaces such as Al_2O_3 , c- SiO_2 and MgO by MeV energy highly charged ions. These materials have been irradiated by MeV Pb and Xe ions under different grazing angles of incidence and normal incidence. Surface tracks take the different form of a chain of hillocks on different crystals, therefore more easily to identify than single ion-induced hillocks under normal incidence. Fig. 1 shows the comparison of grazing incidence (0.5°) and normal incidence (90°) on the shape of surface nanostructures. It is due to the different mechanism of energy deposition.

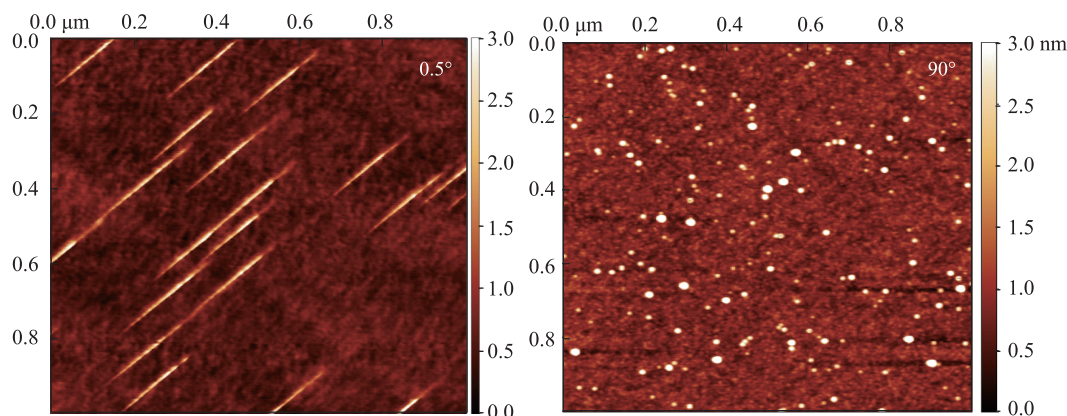


Fig. 1 (color online) Irradiation of Al_2O_3 by 100 MeV Pb^{28+} ions by two angles, respectively.

References

- [1] F. Aumayr, S. Facsko, J. Phys. Cond. Matt., 23(2011)393001.
- [2] Y. Y. Wang, et al, Sci. Reps., 4(2014)5742.