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Shaping forms in the cellular automaton model

Marta Chabowska

M. Załuska - Kotur

Institute of Physics, Polish Academy of Sciences, Poland

The surface morphology and its evolution are critical to the production of electronic and optoelectronic devices. This phenomenon is intriguing in its own right, particularly with respect to the underlying mechanisms. In this talk, I will present the results of studies on the role of surface potential energy in forming various patterns on crystal surfaces, as well as on designing subsurface line defects, including screw and edge dislocations, using Vicinal Cellular Automaton (VicCA) and Terrace-Ledge-Kink Cellular Automaton (TLK-CA). By distinguishing between surface diffusion and adatom incorporation and decoupling the lattice geometry from the kinetic deposition of adatoms, we can identify the key factors influencing the dynamics of surface patterns. A detailed analysis of the diffusion process reveals the conditions under which meanders, three-dimensional mounds, nanopillars, step bunching, and characteristic hillock patterns form.

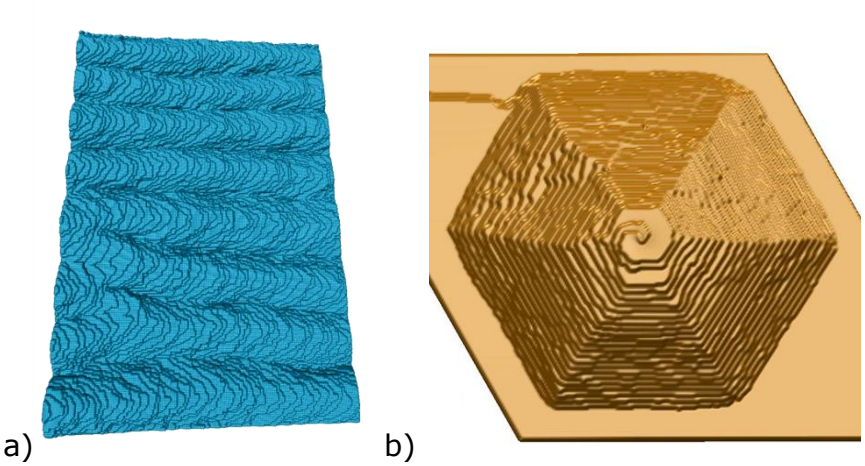

Fig. 1. Examples of the surface patterns occurring during the crystal growth: a) meanders, b) hillock with screw dislocation.

Location: Seminar room on II floor, IHPP PAS New Technologies building
Al. Prymasa Tysiąclecia 98, 01-424 Warsaw,Poland
or get the Zoom link at: nitride_seminar@unipress.waw.pl