The collaboration research for the Dual Graduate School between VNU and JAIST

[Title of collaboration research]: High resolution transmission electron microscope study of nano-scale materials with aid of computational science

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[Reference home-page address]:

[Other references]:

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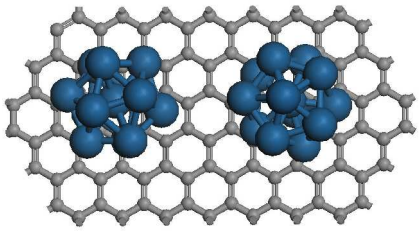
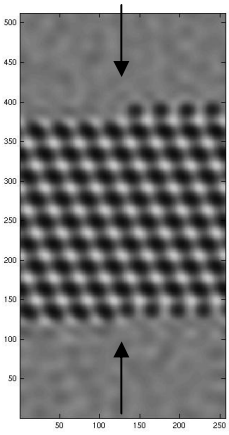
In this collaboration research we will carry out analyses of atomic structures of nano-scale materials by utilizing a high resolution transmission electron microscope(HRTEM) in Nano-material Center of JAIST. Nano-scale materials which will be studied in this research include nano-wires of semiconductors and ultra-fine metal particles which are synthesized in VNU and JAIST for development of new functional materials. The uniqueness of this research is its full integration of computational science in the structure analysis with HRTEM images. Simulations of model atomic structures with the first principle molecular dynamics as well as simulations of HRTEM images based on the electron scattering theory will be carried out by utilizing the computational facility of JAIST.



Ex. 1

A model for first principle molecular dynamics simulation of Pt clusters adsorbed on carbon nanotube



Ex. 2

A HRTEM image calculated by using the multi-slice method. There are two types of interfaces between amorphous Ge oxide and a Ge single crystal. One is the inter-bilayer termination, and the other is the intra-bilayer termination. The calculated image shows that there are two types of atomic steps (indicated by arrows) which can be distinguished from each other by HRTEM observations.

EQUIPMENT:

A transmission electron microscope, Hitachi H-9000NAR at the Center for Nano Materials and Technology, JAIST. The accelerating voltage is 300kV and the resolution is 0.18nm.