

Physics Colloquium

Michigan Technological University

Thursday, September 27, 2007

4:00 pm

Room 139, Fisher Hall

Novel Nanostructured Materials: Boron Sheets, Spheres & Nanotubes

Ihsan Boustani

Universität Wuppertal, Germany

(boustani@uni-wuppertal.de)

Abstract

Nanosystems are linked to many areas of science and technology particularly to one field in nanotechnology. Some of the major aims of the current research are developing, simulating, modelling and predicting new structures of nanoclusters, nanotubes and nanospheres to build pre-selected, uniform nanostructured materials with specific properties e.g. super hardness, superconductivity, super-lightness and propellance. One of our contributions in the field of nanostructured materials were the novel structural formations of boron clusters proposed for the first time [1]. We predicted the *quasiplanarity* of boron clusters [2] and *nanostuctures* in tubular forms [3]. Further contributions followed in a series of theoretical and experimental studies exploring new formations. On one side, the *quasiplanarity* of clusters was confirmed by A. Ricca *et al.* [4] and of sheets by Pandey *et al.* [5] *theoretically*, and by H. J. Zhai *et al.* [6] *experimentally*. On the other side, the *nanostuctures* were *experimentally* confirmed in form of single-wall boron nanotubes by D. Ciuparu *et al.*[7] and in form of boron nanowires by L. M. Cao *et al.* [8] for the first time, followed by C. J. Otten *et al.*[9] and S.Iijima *et al.* [10], and many others. These groups have succeeded to synthesize crystalline as well as amorphous boron nanowires.

Biography

Prof. Boustani is associate professor at University of Wuppertal, Germany. He has received the PhD degree from the Free University of Berlin in theoretical and computational chemistry and related applications in the physics and chemistry of metal clusters. In 1992 he moved to the University of Wuppertal where he completed the habilitation degree. His thesis dealt with the topic of density functional theory in chemistry. Prof. Boustani participated in many international conferences and was a guest professor at different universities. He published numerous articles in international journals and books. His recent main contributions are focused on the research field of elemental boron and its potential applications in industry.