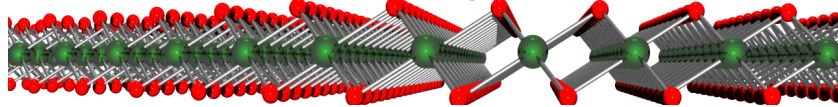




Center for the Computational Design of Functional Layered



March 20, 2017

Temple University, SERC Room 703, 12:30 PM

Atomistic Growth Mechanisms and Functionalization of Two-Dimensional Materials

Zhenyu Zhang, International Center for Quantum Design of Functional Materials (ICQD) University of Science and Technology of China

Since the first isolation of graphene from graphite by mechanical exfoliation, two-dimensional (2D) materials have been occupying the central stage of today's condensed matter physics and materials sciences because of their rich emergent properties. Many members of the ever-expanding 2D materials family, including graphene, silicene, phosphorene, borophene, hexagonal boron nitride, transition metal dichalcogenides, and even the strong topological insulators, share the distinct commonality of possessing relatively weak van der Waals (vdW) interlayer coupling, whereas each member may invoke its own fabrication approaches, and is characterized by its unique properties. In this talk, we will first discuss the major atomistic processes and related morphological evolution in nonequilibrium growth of 2D materials and their lateral or vertical heterostructures, emphasizing the vital importance of vdW interactions in these systems. We will also briefly highlight on some recent advances in the property optimization and functionalization of 2D materials, including optical, electronic, spintronic, and catalytic aspects.

Prof. Zhenyu Zhang, University of Science and Technology of China (USTC) (zhangzy@ustc.edu.cn)



Prof. Zhenyu Zhang received his B.S. degree from Wuhan University in 1982 and PhD degree from Rutgers University in 1989, both in physics. He was a Distinguished Research Scientist in the Materials Science & Technology Division of Oak Ridge National Laboratory and Professor of Physics (Chair of Excellence) at the University of Tennessee, USA before joining USTC in January 2011. Since 2011, he has been a Qianren Chair Professor at USTC and serves as co-founding Director of the International Center for Quantum Design of Functional Materials (ICQD). His research interests lie in the fields of theoretical understanding of the formation, stability, properties, and potential applications of low-dimensional materials. His most recent research emphases have been on quantum design of functional materials for clean energy and quantum information. He has authored/coauthored ~270 peer-reviewed papers, and has disseminated the research findings in over 280 invited/keynote/plenary talks and lectures at professional meetings and research institutions. He is a fellow of the American Physical Society, and has served or currently serves on the editorial boards of several professional journals (including serving as divisional associate editor of Physical Review Letters during 2005-2010).