# RADHIKA C. MANI

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### **RESEARCH INTERESTS**

• Material synthesis using chemical vapor deposition • Atomistic modeling of growth kinetics of crystals and thin films

### **EDUCATION**

PhD, Chemical Engineering, University of Louisville, Louisville, KY 40292, August 2004.

• Dissertation Title: *Nucleation and growth studies of crystalline carbon at nanoscale.* Dissertation Advisor: Prof. Mahendra Sunkara

B.E., Chemical Engineering, Maharaja Sayajirao University, Baroda, Gujarat, India, July 2000.

### **APPOINTMENTS**

Post-doc, University of California at Santa Barbara, August 2004 - present Graduate Teaching Assistant, University of Louisville, May 2003 – August 2004.

• Assisted in teaching undergraduate and graduate level chemical engineering courses Grosscurth Fellow, Speed Scientific School, University of Louisville, May 2001 - May 2003 Graduate Research Assistant, University of Louisville, August 2000 - May 2001

# SUMMARY OF RESEARCH ACTIVITIES

- Performed Kinetic Monte Carlo simulations (self-written code) to understand the evolution of multiply twinned crystals of diamond, specifically Star-shaped crystals.
- Worked with softwares (Cerius 2, MacTempas) to simulate diffraction from nanocrystals of diamond to understand the structure of metastable phases of diamond.
- Synthesized and analyzed a nanocomposite material containing nanocrystals of diamond and graphite and used it for electrochemical detection of dopamine (a neurotransmitter) and several other neurological solutes
- Synthesized a novel morphological manifestation of carbon, called "carbon nanopipette" and studied its applications for electrochemical detection of dopamine.

## **US PATENTS**

- R. C. Mani, S. Sharma, M.K. Sunkara, R. P. Baldwin, "A Novel Electrode Material System (Glassy Diamond) for Neurological and Bio-Medical Sensing Applications: Synthesis Method and Electrochemical Characteristics", Patent pending (August 2001).
- M. K. Sunkara, R. C. Mani, C. Paterson, "Carbon Nanopipettes: Synthesis and Applications", Patent pending (April 2003).

## PUBLICATIONS

- R. C. Mani, X. Li, M.K. Sunkara, K. Rajan, "Carbon Nanopipettes", Nano Letters; 3(5), 671, (2003).
- R. C. Mani and M. K. Sunkara, "Kinetic Faceting of Multiply Twinned Diamond Crystals during Vapor Phase Synthesis", Diamond and Related Materials; 12, 324, (2003).
- R. C. Mani, S. Sharma, M. K. Sunkara, J. Gullapalli, R. P. Baldwin, R. Rao, A. M. Rao, J. M. Cowley, "Synthesis and Electrochemical Characteristics of a Nanocomposite Diamond Electrode", Electrochemical and Solid-State Letter; 5(6), E32 (2002).
- S. Sharma, H. Li, H. Chandrasekaran, R.C. Mani, M.K. Sunkara, "Synthesis of Inorganic Nanowires and Nanotubes", An invited chapter in the Encyclopedia of Nanoscience and Nanotechnology; Edited by H. Nalwa, American Scientific Publishers, Los Angeles, CA, 10, 373 (2003).
- R. C. Mani, M. K. Sunkara, R. P. Baldwin, J. Gullapalli, J. A. Chaney, G. Bhimarasetti, J. M. Cowley, A. M. Rao, R. Rao, "Nanocrystalline Graphite for Electrochemical Sensing of Neurological Fluids", Submitted (May 2004).
- J. M. Cowley, R. C. Mani, M. K. Sunkara, M. O'Keeffe, and C. Bonnea, "Structures of Carbon Nanocrystals", Submitted (May 2004).

## **CONFERENCE PROCEEDINGS**

- G. Bhimarasetti, R. C. Mani, M. K. Sunkara, K. Rajan, X. Li, "Novel Carbon Nanostructures: Nanopipettes and Nanonozzles", Proceedings of the 7th ADC/FCT Conference, A15, Tsukuba, Japan, (August 2003).
- R. C. Mani, M. K. Sunkara, R. P. Baldwin, "Carbon Nanopipettes: Electrochemical Sensors for neurological fluids", 198f, AICHE annual meeting, San Francisco, USA (Nov 2003).
- R. C. Mani, M. K. Sunkara, R. P. Baldwin, "Carbon Nanopipettes: Synthesis and Electrochemical properties", NATO-ASI Nanoengineered and Nanofibrous Materials Proceedings, Antalya, Turkey, (September 1-11 2003), Edited by S. Guceri, V. Kuznetsov, Y. Gogotsi, Kulwer Press, Dordrecht, NL (May 2004).

## PRESENTATIONS

- Two oral presentations at the AIChE Fall meeting, San Francisco, CA in November 2003
- Oral presentation at the NATO-ASI Meeting, Antalya, Turkey, September 2003
- Poster presentation at the MRS Fall Meeting, Boston, MA in December 2002
- Three oral presentations at the AIChE Fall Meeting, Indianapolis, IN in November 2002
- Two poster presentations at the *Diamond 2002 European Conference*, Granada, Spain, September 2002

## **INVITED TALKS**

- Oral presentation at the KYNanomat Conference, Louisville, KY in September 2003
- Oral presentation at Theoretical Division, Los Alamos National Lab, NM in February 2004

## ACADEMIC HONORS

Who's Who in American Colleges and Universities 2002 • Government Scholarship for being one of the top 100 students in the State in High School (1996) • Principal's best student award in High School (1996)

### **PROFESSIONAL SOCIETY and COMMITTEE MEMBERSHIPS**

- Materials Research Society
- American Institute of Chemical Engineers
- President of the Chemical Engineering Graduate Student Association, UofL (May 2003-present)

### **COLLABORATORS**

Prof. John M. Cowley (Arizona State University) - Electron diffraction studies on nanocrystals
Prof. Apparao M. Rao (Clemson University) - Micro Raman on carbon phases
Prof. Krishna Rajan (Rensselaer Polytechnic Institute) - TEM studies on Carbon Nanopipettes

### REFERENCES

Available upon request.