

Dr. Vijaya Kumar Kayastha

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Education: Michigan Technological University (MTU), Houghton, MI

- Ph. D., Engineering Physics, December 2006
- GPA: 3.64
- Concentration: Carbon nanotubes (CNTs)-based experimental research
- Dissertation: Catalytic Growth of Single-, Double-, and Multi-walled Carbon Nanotubes and Studies of their Potential Applications

Tribhuvan University (TU), Kathmandu, Nepal

- M. Sc., Physics
- First division
- Concentration: Solid State Physics

Relevant Courses:

- Micro Electro Mechanical System
- Transmission Electron Microscopy
- Material Physics
- Statistical Mechanics
- Electrodynamics
- Plasma Dynamics
- Scanning Electron Microscopy
- Quantum Mechanics
- Mathematical Physics
- Classical Mechanics

Research: Michigan Technological University (MTU) – Jan 2007 - present

- Synthesis of pure boron nitride nanotubes (BNNTs) by thermal chemical vapor deposition (CVD) and pulsed laser deposition (PLD)
- Growth and characterization of heterojunctions of carbon nanotubes (CNTs) and boron nitride nanotubes (BNNTs) for future nano-electronic devices
(Funded by US Department of Energy)
- Fabrication of CNT-based nano-electronic devices

Michigan Technological University (MTU) - September 2002 – December 2006

- Growth and characterization of various types of CNTs
- Optimization of growth conditions for controlling the density and structures of CNTs
- Understanding the growth mechanism of CNTs in the thermal CVD
- Manipulation of CNTs by using electric field for future nano-scale devices
- Study the electrical behaviors of CNTs,
- Fabrication of molecular nano-electronic devices by using CNTs as electrodes
(Funded by DARPA, US Department of Defense)
- Study the use of CNTs in Li-ion batteries to make more powerful, smaller and light weight batteries; suitable for portable micro-electronic devices
- Investigating electron field emission from individual and bulk CNTs

Skills and Competencies:

Technical

- Scanning Electron Microscope
- Transmission Electron Microscope
- Focus Ion Beam Microscope
- Raman Spectroscopy
- Energy Dispersive X-ray spectroscopy
- Fourier Transform Infra-Red Spectroscopy
- Pulsed laser deposition of metal thin films
- RF magnetron sputtering of metal thin films
- Thermal Chemical Vapor deposition (CVD)
- Clean room use and photolithography techniques

Computer

- Microsoft Word
- Microsoft Excel
- Power Point
- Kaleidagraph
- Origin

Accomplishments:

- Finalist, "Science as Art" competition in Material Research Society Spring Meeting, 2006, San Francisco
- Nominated for "Exceptional Graduate Student Scholar, 2006", MTU
- Class of 1944 Summer Fellowship (2003), MTU
- The Best Poster Presentation award, Student Poster Presentation - 2005-2006, MTU
- Second Prize, Graduate School Council Colloquium-2005, MTU
- Third prize, Graduate School Poster presentation, 2006, MTU
- Third Prize, Graduate School Council Colloquium - 2006, MTU
- Scholarship in B.Sc., Fellowships in I. Sc. and M. Sc. levels, TU, Nepal
- Supported study by working as a teacher most of the time
- Assembled thermal CVD and plasma CVD systems in the lab

Experience: Michigan Technological University, Houghton, MI

Post Doctoral Research Associate, Jan 2007- present

- Research on "Hetero-Junctions of Boron Nitrides and Carbon Nanotubes: Synthesis and Characterization." (**Funded by US Department of Energy**)

Michigan Technological University, Houghton, MI

Physics Instructor (20 hrs/ week), September 2001-April 2005

- Set-up, instructed and graded undergraduate junior and senior level lab classes
- Instructed and graded mechanics classes for undergraduate levels, excellent feedbacks from students

Budhanilkantha School (Affiliated with Univ. of Cambridge, UK), Kathmandu, Nepal

Physics Instructor & Resident Assistant (100 students), May 1998- May 2001

- Taught physics for O- and A-levels (Univ. of Cambridge course) and 10+ 2 level of Nepal
- Enforced housing regulations, organized and co-ordinated extra-curricular activities

Additional four schools in Nepal

Physics/mathematics instructor

Some Publications:

1. **V. K. Kayastha**, B. Ulmen, Y. K. Yap, "*Effect of graphitic order on field emission stability of carbon nanotubes*," *Nanotech.* **18**, 035206 (2007).
2. S. L. Mensah, **V. K. Kayastha**, I. N. Ivanov, D. B. Geohegan, Y. K. Yap, "*Formation of single crystalline ZnO nanotubes without catalysts and templates*," *Appl. Phys. Lett.* **90**, 113108 (2007).

[Cover of the 12 March 2007 issue of Applied Physics Letters.]

[The most downloaded article in Applied Physics Letters during March 2007]

3. **V. K. Kayastha**, S. Wu, J. Moscatello, Y. K. Yap, "*Synthesis of vertically aligned single- and double-walled carbon nanotubes without etching agents*," *J. of Phys. Chem. C* **111**, 10158 (2007).
4. J. Moscatello, J. Wang, B. Ulmen, **V. K. Kayastha**, M. Xie, S. Mensah, S. Wu, A. Pandey, C. Lee, A. Prasad, and Y. K. Yap, "*Growth of Carbon, Boron Nitride and ZnO Nanotubes for Biosensors*," in *ECS Transactions – Cancun, Volume 3, "E6-Bioelectronics, Biointerfaces, and Biomedical Applications*," (In press).
5. Ulmen, **V. K. Kayastha**, A. DeConinck, J. Wang, Y. K. Yap, "*Stability of field emission current from various types of carbon nanotube films*," *Diamond & Relat. Mater.* **15**, 212 (2006).
6. J. Wang, **V. K. Kayastha**, Y. K. Yap, Z. Fan, J. G. Lu, Z. Pan, I. Ivanov, A. A. Puzosky, D. B. Geohegan, "*Low temperature growth of boron nitride nanotubes on substrates*," *Nanolett.* **5**, 2528 (2005).
[Unsolicited News Coverage in Materials Today Vol. 9 (no 1-2), Page 9, Jan-Feb, 2006]
7. **V. K. Kayastha**, Y. K. Yap, Z. Pan, I. N. Ivanov, A. A. Puzosky, D. B. Geohegan, "*High density vertically aligned multiwalled carbon nanotubes with tubular structures*," *Appl. Phys. Lett.* **86**, 253105 (2005).
[Also published in Virtual Journal of Nanoscale Science & Technology, June 27, 2005 issue]
8. J. Menda, B. Ulmen, L. K. Vanga, **V. K. Kayastha**, Y. K. Yap, Z. Pan, I. N. Ivanov, A. A. Puzosky, D. B. Geohegan, "*Structural control of vertically aligned multiwalled carbon nanotubes by RF plasmas*," *Appl. Phys. Lett.* **87**, 173106 (2005).
[Also published in Virtual Journal of Nanoscale Science & Technology, Oct. 31, 2005 issue]
9. Y. K. Yap, **V. K. Kayastha**, J. Menda, L. K. Vanga, J. Wang, A. Kieckhafer, D. Massey, L. B. King, "*Vertically Aligned Carbon Nanotubes as the Sputter Resist in Space Propulsive Systems*," *Mater. Res. Soc. Symp. Proc.* **851**, Warrendale, PA, (2005), paper NN 2.2.
10. **V. K. Kayastha**, Y. K. Yap, S. Dimovski, Y. Gogotsi, "*Controlling Dissociative Adsorption for effective Growth of Carbon nanotubes*," *Appl. Phys. Lett.* **85**, 3265 (2004).
[Also published in Virtual Journal of Nanoscale Science & Technology, Nov. 1, 2004 issue]

11. Y. K. Yap, J. Menda, L. K. Vanga, **V. K. Kayastha**, J. Wang, L. B. King, S. Dimovski, Y. Gogotsi, "*Testing Multiwall Carbon Nanotubes on Ion Erosion for Advanced Space Propulsion*," Mater. Res. Soc. Symp. Proc. **821**, Warrendale, PA, (2004), paper P 3.7.
12. Y. K. Yap, **V. K. Kayastha**, S. Hackney, S. Dimovski, Y. Gogotsi, "*Effect of Carrier Gas on the Growth Rate, Growth Density, and Structure of Carbon Nanotubes*," Mater. Res. Soc. Symp. Proc. **818**, Warrendale, PA, (2004), paper M 11.31.