

Li TAO

Research Associate
Microelectronics Research Center
University of Texas at Austin
E-mail: tao@mail.utexas.edu

10100 Burnet Road, Bldg 160
MER 2.206V, M/S 9900
Austin, TX 78758
Cell phone: 214-533-5622

OBJECTIVE

Research position in which nanofabrication, material processing and characterization can be applied toward novel nano-scale novel materials or devices

PROFILE SUMMARY

- Extensive education in interdisciplinary program of **material science and electrical engineering**
- Over 4 years of R&D experience in **cleanroom** nanofabrication, material processing and characterization
- Proficient in documentation and technical writing as well as **trouble-shooting** for result-oriented project
- Experienced in leading or participating **team-work** projects and **self-motivated** in independent work

RESEARCH EXPERTISE

- **Nano-Lithography:** EBL, Nanoimprint (**thermal and S-FIL**), and Directed self-assembly(DSA)
- **Thin film deposition:** LPCVD, PECVD, ALD; e-beam evaporation and sputtering
- **Etching techniques :** Deep silicon etching (DSE); conventional RIE, CCP and ICP etching
- **Characterization:** SEM, SPM/AFM, Raman, UV-vis, XPS, XRD and TEM

EXPERIENCE

- **Nanofabrication platforms for graphene based plastic/flexible nanoelectronics:** Sep. 2010~present
 - LPCVD growth of monolayer **graphene and CNT** and corresponding **material characterization**
 - Investigated À-la-carte platform (**EBL, S-FIL, DSA**) for nanofabrication down to 10 nm on plastics
 - Demonstrated prototype **graphene field-effect transistor** (FET) on **polyimide flexible substrates**
 - Delivered 5 publications and **technical writing** to help secure ONR research funding

PIs: Prof. Deji Akinwande and Prof. Rodney Ruoff (UT Austin)

- **Synthesis and characterization of carbon species: graphene, CNT and DLC:** Mar. 2007~present
 - **CVD** of high quality monolayer **graphene** at wafer-scale on evaporated hydrogen rich Cu (111) film
 - **Raman, EBSD and XRD** characterization of synthesized graphene and transfer onto arbitrary substrate
 - PECVD of **diamond-like carbon (DLC)** and **Raman, UV-vis, XPS** characterization
 - First demonstration of sub 50 nm DLC template and step-flash imprint (**S-FIL**) with high fidelity
 - As project leader, delivered 4 journal papers cited over 15 times and 5 conference presentations

PIs: Prof. Walter Hu and Prof. Overzet (UT Dallas); Collaborator: Prof. C.G. Wilson (UT Austin)

- **Micro/Nano-fabrication of lab-on-a-chip nanoelectronics and sensor devices:** Sep. 2009~ Aug. 2010
 - **Integrated** lab-on-a-chip **platform** for studying fluidic dynamics of nanoparticles for bio-sensing
 - Designed process flow and reliability control on fabrication of PDMS or ETFE **flexible sensor devices**
 - Development of transferring and patterning **CNT on flexible PDMS substrate** for nanoelectronics

PIs: Prof. Walter Hu (UT Dallas), Prof. Jinming Gao (UT Southwestern Medical Center) and Prof. Yaling Liu (Leigh Univ.)

EDUCATION

- Ph.D. in Materials Science & Engineering, University of Texas at Dallas, GPA: 3.82/4.0, August 2010
- Master in Materials Science & Engineering, University of Texas at Dallas, GPA: 3.8/4.0, May 2008
- Bachelor in Materials Science & Engineering, Southeast University (China), GPA: 90/100, June 2004

MAJOR PUBLICATIONS (first and second authors)

○ **PEER-REVIEWED JOURNAL PAPER**

- [1] **L. Tao**, J. Lee, H. Chou, M. Holt, R. S. Ruoff and D. Akinwande, "Synthesis of defect-free monolayer graphene at reduced temperature on hydrogen enriched evaporated copper (111) films" (Accepted to ACS Nano)
- [2] **L. Tao**, J. Lee, D. Akiwande, "Nanofabrication down to 10 nm on a plastic substrate", *J. Vac. Sci. Technol.* vol 29, 06FG07 (2011)
- [3] (**Invited review**) **L. Tao**, W. Hu, Y. Liu, G. Huang, B. D. Sumer and J. Gao, "Shape-specific polymeric nanoparticles for nanomedicine", *Exp. Biol. Med.* 236 (1), 20-29, 2011.
- [4] **L. Tao**, X. Zhao, J. M. Gao and W. Hu, "Lithographically defined uniform worm-shaped polymeric nanoparticles", *Nanotechnology* **21** (9): p. 095301, 2010
- [5] **L. Tao**, S. Ramachandran, C. T. Nelson, M. Lin, L. J. Overzet, M. Goeckner, G. Lee, C. G. Willson, W. Wu, and W. Hu , "Durable diamond-like carbon templates for UV nanoimprint lithography," *Nanotechnology* **19** (10) 105302/1-105302/7, 2008.
- [6] **L. Tao**, A. Crouch, F. Yoon, B. Lee, H. Hillebrenner, J. Setti Guthi, J. Kim, and J. M. Gao, and W. Hu , "Induced patterning of organic and inorganic materials by spatially discrete surface energy," *J. Vac. Sci. Tech. B.* 25 (6), pp. 1993-1997, 2007.
- [7] **L. Tao**, S. Ramachandran, C. T. Nelson, L. J. Overzet, M. J. Goeckner, G. S. Lee and W. Hu, "Nanofabrication of diamond-like carbon templates for nanoimprint lithography", *MRS P* 956, 243, 2007.
- [8] S. Ramachandran, **L. Tao**, T. H. Lee, S. Sant, L. J. Overzet, M. J. Goeckner, M. J. Kim, G. S. Lee, and W. Hu, "Deposition and Patterning of Diamond-Like Carbon as Anti-Wear Nanoimprint Templates," *J. Vac. Sci. Technol. B.* pp. 2993-2997, 2006.

○ **CONFERENCE PAPER/PRESENTATIONS**

- (1) **L. Tao** (talk), J. Lee, M. Holt, H. Chou, R.S. Ruoff and D. Akinwande, "Wafer-scale synthesis of igh quality graphene on deposited hydrogen enriched Cu (111) film," ISDRS, College Park, MD, Dec. 9, 2011
- (2) **L. Tao** (talk), J. Lee and D. Akinwande, "Nanofabrication down to 10 nm on a plastic substrate," 55th International conference on Electron, Ion and Photon Beam Technology and Nanofabrication (EIPBN), Las Vegas, NV, May 30, 2011.
- (3) **L. Tao**, H. Chen, S. G. Yang, J.M. Gao and W. Hu, "Lithographically Defined Polymer Disc and Rod Shaped Particles for Nanomedicine Applications," 53rd EIPBN, P-4-02, Marco Island, FL, May 30, 2009.
- (4) **L. Tao**, S. Ramachandran, L. J. Overzet, M. Goeckner, M. Kim, G. S. Lee and W. Hu, " Stability of Diamond-Like Carbon (DLC) Coating on Nanoimprint Templates ", Materials Research Society (MRS) Fall meeting, DD3.22, Boston MA, Nov. 26-30, 2007.
- (5) **L. Tao**, C. Nelson, S. Ramachandran, M. Goeckner, L. Overzet, W. Hu, "Sub-50nm Scratch-Proof DLC Molds For Reversal Nanoimprint Lithography", 51st EIPBN, PI-7, Denver, CO, May 30, 2007.
- (6) **L. Tao** (talk), S. Ramachandran, C. T. Nelson, T. H. Lee, L. J. Overzet, M. J. Goeckner, M. J. Kim, G. S. Lee and W. Hu, "Nanofabrication of Diamond-like Carbon Templates for Nanoimprint Lithography," MRS Fall, J13.4, Boston MA, Nov.27-Dec.1,2006.

HONORS AND AWARDS

- April 2010: Inventor recognition award by UT Dallas, April 2010
- Feb 2010: Invited member to Golden Key International Honor Society (top graduates at UT Dallas)
- May 2009: Student travel support awarded by 53rd International conference on Electron, Ion and Photon Beam Technology and Nanofabrication (EIPBN) conference, American Vacuum Society
- July. 2004: *Honored Bachelor Thesis*, Southeast University, Nanjing, China