PERSONAL INFORMATION

Narendra Kurra, Ph.D.

Department of Materials Science & Engineering,
Drexel University, Philadelphia, PA, USA

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https://scholar.google.com/citations?user=GkreFaEAAAAJ&hl=en

Sex Male | Date of birth 8th July, 1986 | Nationality Indian

RESEARCH EXPERIENCE
Nano materials & Energy storage

11/2015–Present

Postdoctoral Research Associate

P. I. : Prof. Yury Gogotsi

Dept. of Materials Science & Engineering,
Drexel University, PA, USA
Project Title: "***MXenes for Sodium ion storage***"

06/2014–06/2015

SABIC Postdoctoral Fellow

P. I. : Prof. Husam Alshareef

Division of Materials Science & Engineering,
King Abdullah University of Science and Technology (KAUST), KSA
Project Title: "***On-Chip Energy Storage***"

10/2013–06/2014

Postdoctoral Research Associate

P. I. : Prof. Husam Alshareef

Division of Materials Science & Engineering,
King Abdullah University of Science and Technology (KAUST), KSA

EDUCATION AND TRAINING

8/2008–9/2013

PhD (Materials Science)

Chemistry & Physics of Materials Unit, Jawaharlal Nehru Centre for Advanced Scientific Research, Bangalore, India.

Thesis Title: "***2D Nanocarbons: Functional aspects and Device Fabrication***"

7/2010–11/2010

Visiting Research Scholar

Birck Nanotechnology Centre, Purdue University, USA

Project Title: "***Charge Storage in Mesoscopic Graphitic Islands***"

1/2008–5/2008 **Master of Science (Physical Chemistry)**

Supervisor: Prof. Anunay Samanta.

School of Chemistry, University of Hyderabad, Hyderabad, India

Thesis Title: "***Investigations on Optical Properties of Room Temperature Ionic Liquids***"

8/2006–6/2008 **Master of Science (Chemistry)** CGPA: 8.6 out of 10 (topper of the batch)

University of Hyderabad, Hyderabad, India

6/2003–5/2006 **Bachelor of Science (Mathematics, Physics & Chemistry)** Distinction (94%)

Sri Chundi Ranganayakulu College, Chilakaluripet, Guntur, India

6/2001–4/2003 **Intermediate Education (Mathematics, Physics & Chemistry)** Distinction (95.6%)

ACADEMIC ACHIEVEMENTS

Honours and Awards

1. Won the prestigious SABIC Postdoctoral Fellowship award for the year 2014-2015 at KAUST.
2. Selected after a preliminary screening followed by personal interview, including group discussion in 2008, and awarded the **Doctoral fellowship** of the International NRW Graduate School of Chemistry (GSC-MS) in WWU Münster, Germany. – *denied the offer.*
3. Qualified for the National Eligibility Test (NET) **in top 5%** for Junior Research Fellowship (**JRF**) in June, 2008 conducted jointly by the Council of Scientific and Industrial Research (CSIR) and University Grants Commission (UGC).
4. Qualified for **GATE** (Graduate Aptitude Test in Engineering) conducted by Indian Institute of Technology (IIT)-Delhi in 2008 (**All India 64th Rank, percentile of 99%**).
5. Selected for PhD programme at the top Indian institutes, TATA Institute of Fundamental Research (TIFR) and Indian Institute of Science (IISc) – *denied the offers.*
6. Selected as an **Academic Council member** by the Vice Chancellor of University of Hyderabad (during the academic year 2007-2008).
7. Awarded **Achiever Award, gold medal for being topper of 2006-2008 MS batch by School of chemistry,** University of Hyderabad.
8. Secured **All India 3nd rank** in the entrance exam followed by personal interview, for admission into Master of Science in Chemistry in 2006 conducted by University of Hyderabad (**UoH**), India.
9. Secured **All India 10th rank** in the entrance exam for admission into Master of Science in Chemistry in 2006 conducted by Pondicherry Central University (**PCU**), India.
10. Secured **All India 12th rank** in the entrance exam for admission into Master of Science in Chemistry in 2006 conducted by Banaras Hindu University (**BHU**), India.
11. Won the **gold medal** in 2006 for the highest marks achieved in Bachelor of Science from the Sri Chundi Ranganayakulu College, India.
12. Awarded **performance based scholarship for the topper of the batch** and all mandatory tuition fees were waived in Bachelor of Science.

LIST OF PUBLICATIONS

1. C. Couly, M. Alhabeb, K. L. Van Aken, **Narendra Kurra**, L. Gomes, A. M. Navarro-Suárez, Babak Anasori, Husam N. Alshareef, Yury Gogotsi "Asymmetric flexible MXene-reduced graphene oxide microsupercapacitor" 2017, Submitted.
2. Pranati Nayak[+], Qiu Jiang[+], **Narendra Kurra**[+], Xinbing Wang, Ulrich Buckner and H. N. Alshareef "Pt decorated laser scribed graphene as HER catalyst" Nano Energy, 2017, Submitted.
3. Qiu Jiang, **Narendra Kurra**, Chuan Xia, and H. N. Alshareef "**Hybrid Microsupercapacitors with Vertically-Scaled 3D Current Collectors Fabricated using a Simple Cut-and-Transfer Strategy** " Advanced Energy Materials, 2017, 7, 1601257.
4. You-Yu Peng, Bilen Akuzum, **Narendra Kurra**, Meng-Qiang Zhao, Mohamed Alhabeb, Babak Anasori, Emin Caglan Kumbur, Husam N. Alshareef, Ming-Der Ger, Yury Gogotsi "All-MXene ($Ti_3C_2T_x$) Solid-State Microsupercapacitors for On-Chip Energy Storage" Energy & Environmental Science, 2016, 9, 2847-2854.
5. **Narendra Kurra**, Bilal Ahmed, Yury Gogotsi, and H. N. Alshareef "MXene-on-Paper Co-Planar Microsupercapacitors" Advanced Energy Materials, 2016, 6, 1601372.
6. Pranati Nayak, **Narendra Kurra**, Chuan Xia and H. N. Alshareef, "Highly Efficient Laser Scribed Graphene Electrodes for On-chip Electrochemical Sensing Applications" Advanced Electronic Materials, 2016, 2, 1600185.
7. **Narendra Kurra**, Qiu Jiang, Ahad Syed, Chuan Xia and H. N. Alshareef "Frequency Response of Conducting Polymer Microsupercapacitors Matching that of Electrolytic Capacitors", ACS Appl. Mater. Interfaces, 2016, 8, 12748.
8. Sarath Kumar[+], **Narendra Kurra**[+], and H. N. Alshareef "Enhanced high temperature thermoelectric response of sulphuric acid treated poly (3, 4-ethylenedioxythiophene): poly (4-styrenesulfonate) polymer thin films", J. Mater. Chem. C 2016, 4, 215 [[+] Equal contribution].
9. Qiu Jiang[+], **Narendra Kurra**[+], and H. N. Alshareef "Marker Pen Lithography for Flexible and Curvilinear on-Chip Energy Storage", Advanced Functional Materials, 2015, 25, 4976. [[+] Equal contribution].
10. **Narendra Kurra**, Qiu Jiang and H. N. Alshareef "A General Strategy for the Fabrication of High Performance Microsupercapacitors", Nano Energy, 2015, 16, 1.
11. **Narendra Kurra**, Chuan Xia and H. N. Alshareef "Ternary chalcogenide micro-pseudocapacitors for on-chip energy storage", Chem Comm, 2015, 51, 10494.
12. **Narendra Kurra**, M. K. Hota, and H. N. Alshareef "Conducting Polymer Micro-Supercapacitors for Flexible Energy Storage and Frequency Response" 2015, Nano Energy, 13, 500.
13. **Narendra Kurra**, Ruiqi Wang, and H. N. Alshareef "All Conducting Polymer Electrodes for Asymmetric Flexible Solid-State Supercapacitors", 2015, J. Mater. Chem. A 2015, 3, 7368.
14. Jihoon Park, **Narendra Kurra**, Mahmoud Almadhoun, Ihab Odeh and Husam N Alshareef "A Two-Step Annealing Process for Enhancing the Ferroelectric Properties of poly(vinylidene fluoride) (PVDF) Devices", J. Mater. Chem. C 2015, **3**, 2366.
15. **Narendra Kurra**, Nuha A. Alhebshi, and H. N. Alshareef "Microfabricated pseudocapacitors using $Ni(OH)_2$ electrodes exhibit remarkable volumetric capacitance and energy density",

Advanced Energy Materials, 2015, 4, 1401303.

16. **Narendra Kurra**, Jihoon Park and H. N. Alshareef "A conducting polymer nucleation scheme for efficient solid-state supercapacitors on paper", J. Mater. Chem. A, 2014, 2, 17058-17065.
17. **Narendra Kurra**, S.Kiruthika, and G. U. Kulkarni "Solution processed sun baked electrodes for flexible supercapacitors" RSC Advances, 2014, 4, 20281-20289.
18. **Narendra Kurra**, Ronald G Reifenberger and G. U. Kulkarni "Nanocarbon-SPM Synergy: Fundamental Aspects to Nanoscale Devices" ACS Applied Materials & Interfaces, 2014, 6, 6147–6163.
19. U. Mogera, **Narendra Kurra**, R. Dhanya, Chandrabhas Narayana, and G. U. Kulkarni "Low cost, rapid synthesis of graphene on Ni: An efficient barrier for corrosion and thermal oxidation" Carbon, 2014, 78, 384-391.
20. T. Gowthami, **Narendra Kurra** and G. Raina "Interaction and dynamics of ambient water adlayers on graphite probed using AFM voltage nanolithography and electrostatic force microscopy" Nanotechnology, 2014, 25, 155304.
21. **Narendra Kurra** "Tunable Atomic force microscopy bias lithography on Electron beam induced carbonaceous platforms" AIP Advances, 2013, 3, 092108.
22. **Narendra Kurra** and G. U. Kulkarni "Pencil-on-paper:Electronic devices", Lab Chip, 2013, 13, 2866-2873.
23. **Narendra Kurra**, Dipanwita Dutta, and G. U. Kulkarni "Field effect transistors and RC filters from pencil-trace on paper" Physical Chemistry Chemical Physics, 2013, 15, 8367.
24. **Narendra Kurra**, Venkata Srinu Bhadram, Chandrabhas Narayana, and G. U. Kulkarni "Few layer graphene to graphitic films: Infrared photoconductive versus bolometric response" Nanoscale 2013, 5, 381.
25. **Narendra Kurra**, Venkata Srinu Bhadram, Chandrabhas Narayana, and G. U. Kulkarni "Nanocrystalline graphene: Field effect transistors and Infrared photodetectors" Nanotechnology 2012, 23, 425301.

(Research highlight on this article appeared in Nanotech web 2012)

26. **Narendra Kurra**, Venkata Srinu Bhadram, Chandrabhas Narayana, and G. U. Kulkarni "Field-Effect Transistors Based on Thermally Treated Electron Beam-Induced Carbonaceous Patterns" ACS Applied Materials & Interfaces 2012, 4, 1030.
27. **Narendra Kurra**, Abhay A. Sagade, and G. U. Kulkarni "Ultrafast Direct Ablative Patterning of HOPG by Single laser pulses to produce graphene ribbons" Advanced Functional Materials 2011, 21, 3836.

(Research highlights on this article appeared in Materials view, Nature india, 2011)

28. **Narendra Kurra**, Gyan Prakash, S Basavaraja, Timothy S Fisher, G U Kulkarni and Ronald G Reifenberger "Charge storage in mesoscopic graphitic islands fabricated using AFM bias lithography" Nanotechnology 2011, 22, 245302.

(Research highlights on this article appeared in Nanotech web and Nature India, 2011)

29. **Narendra Kurra**, T. Vijaykumar, and G. U. Kulkarni "CNT Manipulation: Inserting a Carbonaceous Dielectric Layer Beneath Using Electron Beam Induced Deposition" J. Nanosci. Nanotech. 2011, 11, 1025.
30. K. D. Mallikarjuna Rao, T. Bhuvana, B. Radha, **Narendra Kurra** and G. U. Kulkarni "Metallic

conduction in NiS_2 nanocrystalline structures" J. Phys. Chem. C 2011, 21, 10462.

31. T. Vijaykumar, **Narendra Kurra** and G. U. Kulkarni "Electron beam induced carbonaceous deposition as a local dielectric for CNT circuits" Int. J. Nanosci. 2011, 10, 935.
32. **Narendra Kurra**, Adina Scott, and Giridhar U. Kulkarni "Electrocondensation and Evaporation of Attoliter Water Droplets: Direct Visualization Using Atomic Force Microscopy" Nano Research 2010, 3, 307.

PATENTS FILED

1. **Direct Laser Ablative Patterning of Graphite To Produce Graphene Ribbons**

Narendra Kurra, Abhay A Sagade and G. U. Kulkarni, **US patent, Application No.**: **13/599,810**

Date of Filing - August 30, 2012.

2. A Process For Synthesis of Graphene

U. Mogera, **Narendra Kurra**, and G. U. Kulkarni, **Indian Patent Application No. 2713/CHE/2014.**

3. Jihoon Park, Narendra Kurra, Mahmoud Almadhoun, Ihab Odeh and Husam N Alshareef "A Two-Step Annealing Process for Enhancing the Ferroelectric Properties of poly(vinylidene fluoride) (PVDF) Devices", SABIC Patent.

POSTER & ORAL PRESENTATIONS

- E-MRS Spring Meeting 2017 (Strasbourg, France 2017)

Oral: MXene-on-paper co-planar microsupercapacitors

- Poster Judge for Drexel Emerging Graduate Scholars Conference, Drexel University, 2017 (Philadelphia, PA, USA)
- MRS Fall Meeting 2016 (Boston, December 2016)

Oral: MXene-Nanocarbon hybrids for Sodium ion storage

- Marker Pen lithography for flexible and curvilinear on-chip energy storage (San Diego, CA, 30 May 2016) –Oral presentation at 229th ECS meeting@ San Diego, CA, USA.
- On-Chip Energy Storage: Scope for micro-pseudocapacitors.On-Chip Energy Storage: Scope for micro-pseudocapacitors (Drexel University, PA, USA, November 2015)

  Oral: On-Chip Energy Storage: Scope for micro-pseudocapacitors.
- MRS Spring Meeting 2015 (San Francisco, April 2015)

Oral: MoS_2 as High Capacity Anode Material for Sodium Ion Batteries: Mechanistic Insight into Surface Passivation and Capacity Retention

- MRS Fall Meeting 2014 (Boston, December 2014)

Poster: Optimized Nucleation Layer Scheme For Flexible Conducting Polymer Supercapacitors on Paper

- 5th Bangalore Nano National conference (Bangalore, December 2012)

Poster: Nanocarbon devices

- Indo-Taiwan Workshop on Nanodevices (November, 2012)

Poster: Graphene and turbostratic graphite based electronic devices

- CPMU unit day (JNCASR, Bangalore, August 2012)

Oral Presentation: Pencil-trace : RC filters & Transistors

- Indo-Europe EICOON workshop on the energy materials (Kolkata, May 2012).

Poster: Deriving graphene ribbons from ultra-fast laser ablative patterning.

- International Conference on Nano Science and Technology (Taj Krishna, Hyderabad, January 2012).

Poster: Ultra-fast direct laser ablative patterning of HOPG to produce graphene ribbons.

- International Conference on Materials for Advanced Technologies, Singapore (June 2011)

Poster: Charge storage in mesoscopic graphitic islands fabricated using AFM bias lithography.

- School on Nanoelectronics-workshop at Purdue university, USA (July 2010).

- International Conference on Nano Science and Technology (Indian Institute of Technology–Bombay (February 2010)

Poster: Electron beam induced deposition as a local dielectric for the CNT and graphene circuits.

- 4^{th} JNC Research Conference on Chemistry of Materials (October 2009)

Poster: Electrocondensation and Evaporation of attoliter water droplets: Direct visulisation using Atomic force microscopy

- Joint India-US Workshop on Scalable Nanomaterials for Enhanced Energy Transport, Conversion and Efficiency (August 2008),

As a volunteer to help in organizing the conference event.

STUDENT SUPERVISION

- Mentoring international visiting students on metal ion capacitors/batteries.
- Mentor for SRSI student, 2014, KAUST.
- Trained Graduate students on various aspects of On-Chip microsupercapacitors
- Teaching assistant at JNCASR for the undergraduate students under the programme of Project Oriented Chemical Education (POCE) (May- Jul 2012).
- Teaching assistant at JNCASR for the course “Basics of Nanoscience” (Jan-Apr 2012).
- Teaching assistant at JNCASR for the “practical chemistry laboratory-I” (Aug-Nov 2011).

TECHINICAL SKILLS AND EXPERTISE

- Nanofabrication – User of Cleanroom facilities at KAUST and Birck Nanotechnology center, Purdue University, USA.
- Photolithography, mask writing, deposition (RF and DC sputtering units, ebeam, thermal evaporation and pulsed laser deposition), plasma etching and vacuum annealing techniques.
- Electron beam lithography, electron beam induced deposition (EBID)
- Focused ion beam lithography
- Universal laser cutter to fabricate microsupercapacitors
- Scanning Probe Microscopy (SPM): Atomic force microscopy (AFM), SPM lithography, Dip pen nanolithography, Scratching, Nanoindentation, Local anodic oxidation lithography, Electrostatic force microscopy (EFM), Kelvin probe force microscopy (KPFM), magnetic force microscopy (MFM).
- Soft lithography, Near field Laser interference lithography.
- Sonoplot, electrospinning.
- Atomic layer deposition (ALD), Electrochemical deposition (ED)
- Spray coating, hydrothermal synthesis
- Field emission scanning electron microscopy (FESEM), Transmission electron microscopy (TEM)
- Optical and Stylus profilometry: Vertical scanning interferometry (VSI), Phase scanning interferometry (PSI), Stitching.
- X-ray diffraction
- Basic Electrochemistry studies, CH instruments, VMP3, solatron analytical, Arbin battery tester
- Basic electrical measurements with source measure unit, four probe resistivity setup, Semiconductor Parameter Analyzer (Keithley 4200), function generator, Oscilloscope.
- UV-visible absorption spectroscopy
- Micromanipulation and making micrometer gap using carbon fibres as shadow masks.
- Acquaintance with Raman spectroscopy, FTIR and confocal microscopy.

PERSONAL SKILLS

Language Skills

Telugu (Native language)

English (Fluent)

Hindi (Fluent)

Communication Skills

Goal oriented, Hard-working, Highly organized, Self-motivated and a Team player.

Teamwork: I have been part of international working groups and collaborated successfully with various Research groups during my PhD in India as well as in the USA.

Intercultural skills: Skilled, Adaptive and Proactive in any multicultural environment.