

# CURRICULUM VITAE



## Personal information

**Dr. Bijoy Kumar Das**

Project Scientist

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## Educational background:

2006-2011 Ph.D. in Physics, Department of Physics, **National University of Singapore (NUS), Singapore. CAP: 4.3/5**

**Thesis title:** Studies on Metal Oxides and Cobalt Nitride as prospective anode materials for Li-ion batteries.

**Thesis supervisor:** Prof. B.V.R. Chowdari

2004- 2006 Master of Technology in Materials Science and Engineering, **Indian Institute of Technology (IIT), Kharagpur, India. CGPA: 8.84/10**

2002- 2004 Master of Science in Physics, **Utkal University, Bhubaneswar, India. Percentage: 75.2/100 (First Class)**

1999-2002 Bachelor of Science (Physics Hons'), **Fakir Mohan University, Odisha, India. Percentage: 80.12/100 (in Hons') (First class with Distinction) 68.7/100 (Grand total).**

1997-1999 Intermediate of Science, Council of Higher Secondary Education, Odisha, India  
**Percentage: 71/100**

1997 10<sup>th</sup> (High School), **Board of Secondary Education, Odisha, India Percentage: 82.1/100**

### **Research experience:**

Nov 2016- Project Scientist (Contract), International Advanced Research Centre for Powder Metallurgy & New Materials (ARCI), Chennai

2012- 2016 Scientist, Helmholtz Institute Ulm (HIU), Institute of Nanotechnology (INT), **Karlsruhe Institute of Technology, Germany.**

2011- 2012 Postdoctoral researcher, **KTH (Royal Institute of Technology), Stockholm, Sweden.**

### **Teaching experience:**

**01/2007-01/2010** Laboratory Assistant (Engineering Physics Laboratory), National University of Singapore, Singapore.

(Designing experiments, conducted laboratory sessions, took viva and graded laboratory reports for undergraduate students).

<b><u>Thesis guided:</u></b>	<b>B.Tech:</b>	1 (Completed)
	<b>M. Sc./ M.Tech.:</b>	3 (Completed) + 2 (on going)
	<b>Ph.D./JRF:</b>	2 (on going)

### **Honors and awards:**

- Graduate Research Scholarship, National University of Singapore, Singapore, **2006-2010.**
- Postgraduate scholarship, Council for Scientific and Industrial Research, Govt. of India, India, **2005-2006.**
- Postgraduate Scholarship, Ministry of Human Resources, Govt. of India, India, **2004-2005.**
- National Scholarship from higher secondary to Master of Science (**1997-2004**), Govt. of India, India.
- Best graduate award being placed in first rank in Physics (Hon's), **2002.**
- Qualified the prestigious Graduate Aptitude Test in Engineering (GATE)-**2004**, with 97 percentile; All India rank-83.
- Qualified CSIR-UGC NET (JRF) in Physics-**2004.**
- Qualified Joint Entrance Screening Test (JEST) in Physics-**2004.**

### **Research Interest:**

- (a) Lithium ion batteries for stationary and electric vehicle applications.
- (b) Sodium ion batteries.
- (c) Supercapacitors
- (d) Tunable magnetism by electrochemical ion insertion.
- (e) Magnetocaloric materials

### **Reviewer of Journals:**

- (i) Journal of Magnetism and Magnetic Materials
- (ii) Materials Chemistry and Physics
- (iii) Powder Technology
- (iv) Nano-Micro Letters
- (v) New Journal of Chemistry
- (vi) RSC Advances
- (vii) ACS Sustainable Chemistry & Engineering

### **Experimental experience:**

#### **(i) Hands on experience in:**

- Powder and thin film X-ray diffraction
- Scanning Electron Microscopy
- Infra-red Spectroscopy
- Raman Spectroscopy
- Pulsed Laser Deposition
- RF- magnetron sputtering
- UV/Visible spectroscopy
- Electrochemical instruments for characterization (Bitrode, Arbin, Biologic, Zahner, Solatron Impedance analyzer, Autolab etc..)
- Physical Property Measurement System (PPMS)
- Thermal analysis Instrument (TGA/DSC)
- BET surface area Analyzer
- Density measurement for powder sample (Pycnometer)
- Basic experience in Atomic Force Microscopy, Transmission Electron Microscopy.

(ii) **Materials preparation skills:**

- Synthesis of micron- and nano- materials using different methods, like Ceramic routes, Carbo-thermal reduction, thermal nitridation, Solution methods: Urea combustion, Oxalate decomposition, Borohydride reduction, Sol-gel, Hydrothermal/Solvothermal synthesis, Co-precipitation methods.
- Experience in growth metal oxides/nitride thin films by RF magnetron sputtering and pulsed laser deposition techniques.
- Experience in preparation of nanomaterials/ nanocomposites using high energy ball milling (Spex).

(iii) **Software skills:**

- Rietveld refinement (TOPAS software) to refine the X- ray data and obtain the crystal parameters.
- Material Data Studio, Diamond to draw the crystal structure from the .cif (crystallographic information file).
- WinXAS and Athena for X-ray absorption spectroscopy data.
- GATAN software for TEM data.
- Z-View and Z- plot for Impedance data.
- Regular use of computer for data analysis and data output with Widows and many other software, such as Origin, Excel and word etc.

**Patent:**

Reversible alteration of a magnetic state of a material” **Bijoy Kumar Das**, Subho Dasgupta, Horst Hahn, Robert Kruk, EP Patent 13172431.2.

**List of publications (h- index: 11): (Total publications-23)**

1. “Towards on-and-off magnetism: reversible electrochemistry to control magnetic phase transitions in spinel ferrites” S. Dasgupta, **B. Das**, Q. Li, T. Baby, S. Indris, M. Knapp, H. Ehrenberg, K. Fink, R. Kruk, H. Hahn, **Adv. Funct. Mater.** 26 (2016) 7507-7515.
2. Enhancement of electrochemical performance by simultaneous substitution of Ni and Mn with Fe in Ni-Mn spinel cathodes for Li-ion batteries, N. Kiziltas-Yavuz, M. Yavuz, S. Indris, N. N. Bramnik, M. Knapp, O. Dolotko, **B. Das**, H. Ehrenberg, A. Bhasker, **J. Power Sources** 327 (2016) 507-518.

3. Intercalation-Driven Reversible Control of Magnetism in Bulk Ferromagnets. S. Dasgupta, **B. Das**, M. Knapp, R.A. Brand, H. Ehrenberg, R. Kruk and H. Hahn, **Adv. Mater.** **26** (2014) 4639-4644. (Cover page).
4. LiF/Fe/V<sub>2</sub>O<sub>5</sub> nanocomposite as high capacity cathode for Lithium ion batteries, **B. Das**, A.Pohl, VSK Chakravadhanula, C. Kübel, M. Fichtner, **J. Power Sources** **267** (2014) 203-211.
5. A disc-like Mo-metal cluster compound, Co<sub>2</sub>Mo<sub>3</sub>O<sub>8</sub> as high capacity anode for Lithium ion batteries, **B. Das**, M. V. Reddy, S. Tripathy, BVR Chowdari, **RSC Advances** **4** (2014) 33883.
6. Oxidation state and local structure of a high-capacity LiF/Fe(V<sub>2</sub>O<sub>5</sub>) conversion cathode for Li-ion batteries, A.H. Pohl, A.A. Guda, V.V. Shapovalov, R. Witte, **B. Das**, F. Scheiba, J. Rothe, A.V. Soldatov, M. Fichtner, **Acta Mater.** **68** (2014) 179.
7. X-ray absorption spectroscopy and energy storage of Ni-doped Cobalt Nitride; (Ni<sub>0.33</sub>Co<sub>0.67</sub>N) prepared by a simple synthesis route, **B. Das**, M. V. Reddy, B.V.R. Chowdari, **Nanoscale**, **5** (2013) 1961.
8. Synthesis of porous-CoN nanoparticles and their application as a high capacity anode for lithium-ion batteries, **B. Das**, M. V. Reddy, G.V. Subba Rao, B.V.R. Chowdari, **J. Mater. Chem.**, **22** (2012) 17505.
9. Synthesis and Li-storage behavior of CrN nanoparticles, **B. Das**, M. V. Reddy, G.V. Subba Rao, B.V.R. Chowdari, **RSC Adv.**, **2** (2012) 9022.
10. "Nano-phase tin hollandites, K<sub>2</sub>(M<sub>2</sub>Sn<sub>6</sub>)O<sub>16</sub> (M = Co, In) as anodes for lithium ion batteries" **B. Das**, M. V. Reddy, G.V. Subba Rao, B.V.R. Chowdari, **J. Mater. Chem.**, **21** (2011) 1171.
11. "Carbothermal synthesis, spectral and magnetic characterization and Li-cyclability of the Mo-cluster compounds, LiYMo<sub>3</sub>O<sub>8</sub> and Mn<sub>2</sub>Mo<sub>3</sub>O<sub>8</sub>" **B. Das**, M.V. Reddy, C. Krishnamoorthy, S. Tripathy, R. Mahendiran, G.V. Subba Rao, B.V. R. Chowdari, **Electrochim. Acta**, **54** (2009) 3360.
12. "Tamarind Seed Derived Carbon as Novel Anode Material for Lithium Ion Battery" S. R. Sahu, D. Parimala Devi, V. V. N. Phanikumar, T. Ramesh, N. Rajalakshmi, G. Praveena, R. Prakash, R. Gopalan, **B. Das**, (Accepted) (2018)

### **List of publication in Conference:**

1. “Hollandite-type compounds,  $K_2(In_2Sn_6)O_{16}$  and  $K_2(Co_2Sn_6)O_{16}$  as anodes for lithium batteries” **B. Das**, M. V. Reddy, G.V. Subba Rao, B.V.R. Chowdari. Proceedings of the 11<sup>th</sup> Asian conference on **Solid State Ionics**, (2008) 69-77.
2. “Li-cycling behavior of Mo-cluster compounds,  $A_2Mo_3O_8$  (A = Zn, Co)” **B. Das**, M. V. Reddy, G. V. Subba Rao, B. V. R. Chowdari, 12th Asian Conference on **Solid State Ionics**, China.

### **Oral presentations/ posters in international conferences:**

1.  $FeF_2$ /graphite nanocomposite: Its Li- storage and kinetic studies by electrochemical techniques, **B. Das**, M. Fichtner, International conference on Energy Science and Technology, Karlsruhe, Germany, 2015.
2. Vanadium and Chromium Molecular Cluster Batteries (MCB): Li- storage and kinetic studies by electrochemical analysis, J. Rinck, **B. Das**, M. Fichtner, International conference on Energy Science and Technology, Karlsruhe, Germany, 2015.
3. New battery systems based on conversion materials: M. Fichtner, **B. Das**, M. Helen, A. Pohl, M. Anji Reddy, Zh. Zhao-Karger; Batterieforum Berlin, Germany, 2015.
4.  $FeF_2/Fe_3O_4$  core-shell nanocomposite as high capacity cathode for Lithium ion batteries, **B. Das**, CVS Kiran, M. Fichtner, 14<sup>th</sup> UECT Ulm Electrochemical Talks, 2014.
5. Oxidation State and Local Structure of a High-Capacity  $LiF/Fe(V_2O_5)$  Conversion Cathode for Li-Ion Batteries, A.H. Pohl, A.A. Guda, V.V. Shapovalov, R. Witte, **B. Das**, F. Scheiba, J. Rothe, A.V. Soldatov, M. Fichtner, ECS meeting abstract:37215 (2014).
6. Oxidation state and local structure of a high-capacity  $LiF/Fe/V_2O_5$  conversion cathode for Li-ion batteries, A. Pohl, **B. Das**, CVS Kiran, M. Fichtner, 14<sup>th</sup> UECT Ulm Electro Chemical Talks, 2014.
7.  $LiF/Fe/V_2O_5$  as high capacity anode for Lithium ion batteries, **B. Das**, A. Pohl, M. Fichtner, 2<sup>nd</sup> International Conference on Materials for Energy Storage, May 12-16 (2013), Karlsruhe, Germany.
8. “Li-cycling behavior of Mo-cluster compounds,  $A_2Mo_3O_8$  (A = Zn, Co)” **B. Das**, M. V. Reddy, G. V. Subba Rao, B. V. R. Chowdari, Proceedings of the 12<sup>th</sup> Asian conference on Solid state Ionics: Fundamental applications and Technological applications; 2-6 May 2010, China. Pages, 820-829.

9. "Nanocomposites,  $(\text{SnO}_{1/2} \text{VO}_x)$  as anodes for lithium ion batteries" **B. Das**, M. V. Reddy, G. V. Subba Rao, B.V.R. Chowdari, presented at International conference on materials for advanced Technologies (ICMAT) -2009 held on 28 June - 3 July, 2009 Suntec city, Singapore.
10. "Hollandite-type compounds,  $\text{K}_2(\text{In}_2\text{Sn}_6)\text{O}_{16}$  and  $\text{K}_2(\text{Co}_2\text{Sn}_6)\text{O}_{16}$  as anodes for lithium batteries" **B. Das**, M. V. Reddy, G.V. Subba Rao, B.V.R. Chowdari. Proceedings of the 11<sup>th</sup> Asian conference on Solid state Ionics: New materials for pollution free Energy devices; 69-77 (2008), India.
11. "Studies on CrN nanoparticles as anode material for lithium ion batteries" **B. Das**, M. V. Reddy, G. V. Subba Rao, B.V.R. Chowdari. Abstract submitted to the 4<sup>th</sup> MRS-S Conference on Advanced Materials, 2008 IMRE, Singapore.
12. "Metal cluster compounds, of  $\text{LiYMo}_3\text{O}_8$  and  $\text{Mn}_2\text{Mo}_3\text{O}_8$  as anode for lithium ion Batteries" **B. Das**, M. V. Reddy, G. V. Subba Rao, B.V.R. Chowdari. Abstract submitted to the 3<sup>rd</sup> MRS-S conference on Advanced Materials, 2008 IMRE, Singapore.
13. "Synthesis of Mo- Cluster compound,  $\text{LiHoMo}_3\text{O}_8$  by carbothermal reduction method and it's reactivity towards Li" **B. Das**, M. V. Reddy G. V. Subba Rao, B.V.R. Chowdari, presented at International conference on materials for advanced Technologies (ICMAT) -2007 held on 1-5 July, 2007 Suntec city, Singapore.