

## Dr. Tapas Kumar Mandal

Assistant Professor

Department of Chemistry

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### Employment & Research Experience



**Assistant Professor** (2011 onwards), Department of Chemistry, Indian Institute of Technology Roorkee, Roorkee, Uttarakhand

**Assistant Professor** (2010-2011), Department of Chemical Sciences, Sikkim University, Sikkim

**Post Doctoral Research Associate** (2008-2010), University of Glasgow, Glasgow, Scotland, UK

**Post Doctoral Associate** (2006-2008), Rutgers University, New Jersey, USA

**Post Doctoral Researcher** (2005-2006), University of New Orleans, Louisiana, USA

**Ph. D.** (2005), Indian Institute of Science, Bangalore

### Research Interests

- ❖ Solid-state materials chemistry, nanomaterials chemistry, hydrogen energy
- ❖ Transition metal oxides, oxyhalides, pnictides, chalcogenides
- ❖ Superconductivity, half-metallic / metallic / semiconducting antiferro-/ferro-/ferri-magnetism (for spintronics), frustrated magnetism, multiferroics, photocatalysis and hydrogen storage
- ❖ Solid-state hydrogen storage in complex hydrides, graphene and nanostructured materials
- ❖ Novel synthetic strategies, structure-property correlation, synthetic control of structure and microstructure, advanced materials design

### Publications:

32. Seema Singh, Vimal Chandra Srivastava, Shang Lien Lo, **Tapas Kumar Mandal**, Gollapally Naresh, Morphology-controlled green approach for synthesizing the hierarchical self-assembled 3D porous ZnO superstructure with excellent catalytic activity, *Microporous Mesoporous Mater.*, 239, 296 (2017). (IF: 3.349)
31. Seema Singh, Vimal Chandra Srivastava, **Tapas Kumar Mandal**, Indra Deo Mall and Shang Lien Lo, Synthesis and application of green mixed-metal oxide nanocomposites materials from solid waste for dye degradation, *J. Environ. Mgmt.*, 181, 146 (2016). (IF: 3.131)
30. Tinku Baidya, Parthasarathi Bera, Oliver Krocher, Olga Safonova, Paula M. Abdala, Birgit Gerke, Rainer Pöttgen, Kaustubh R. Priolkar and **Tapas Kumar Mandal**, Understanding

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- the anomalous behavior of the Vegard's law in  $Ce_{1-x}M_xO_2$  ( $M = Sn$  and  $Ti$ ;  $0 < x \leq 0.5$ ) solid solutions, *Phys. Chem. Chem. Phys.*, 18, 13974 (2016). (IF: 4.449)
29. Rajib Mistri, Dipak Das, Jordi Llorca, Montserrat Dominguez, **Tapas Kumar Mandal**, Paritosh Mohanty, Bidhan Chandra Ray and Arup Gayen, Selective liquid phase benzyl alcohol oxidation over Cu-loaded  $LaFeO_3$  perovskite, *RSC Advances*, 6, 4469 (2016). (IF: 3.289)
28. Gollapally Naresh and **Tapas Kumar Mandal**, Efficient COD Removal Coinciding with Dye Decoloration by Five Layer Aurivillius Perovskites under Sunlight Irradiation, *ACS Sustainable Chem. Eng.*, 3, 2900 (2015). (IF: 5.267)
27. Seema Singh, Vimal Chandra Srivastava and **Tapas Kumar Mandal**, Treatment of Fertilizer Industry Wastewater by Catalytic Per-Oxidation Process using Copper loaded SBA-15, *J. Environ. Sci. Health: Part A*, 50, 1468, (2015). (IF: 1.276)
26. Shweta Garg, Vimal Chandra Srivastava, Seema Singh and **Tapas Kumar Mandal**, Catalytic Degradation of Pyrrole in Aqueous Solution by Cu/SBA-15, *Int. J. Chem. React. Eng.*, 13, 437 (2015). (IF: 0.759)
25. Gollapally Naresh and **Tapas Kumar Mandal**, Excellent Sun-Light-Driven Photocatalytic Activity by Aurivillius Layered Perovskites,  $Bi_{5-x}La_xTi_3FeO_{15}$  ( $x = 1, 2$ ), *ACS Appl. Mater. Interfaces*, 6, 21000, (2014). (IF: 7.145)
24. Seema Singh, Vimal Chandra Srivastava, **Tapas Kumar Mandal** and Indra Deo Mall, Synthesis of different crystalloraphic  $Al_2O_3$  nanomaterials from solid waste for application in dye degradation, *RSC Advances*, 4, 50801, (2014). (IF: 3.289)
23. Rajiv Mistri, Sayantani maiti, Jordi Llorca, Montserrat Dominguez, **Tapas Kumar Mandal**, Paritosh Mohanty, Bidhan Chandra Ray and Arup Gayen, Copper ion substituted hercynite ( $Cu_{0.03}Fe_{0.97}Al_2O_4$ ): A highly active catalyst for liquid phase oxidation of cyclohexane, *Appl. Cat. A: General*, 485, 40 (2014). (IF: 4.012)
22. H. Reardon, J. Hanlon, R. W. Hughes, A. Godula-Jopek, **Tapas K. Mandal** and Duncan H. Gregory; Emerging concepts in solid-state hydrogen storage; The role of nanomaterials design, *Energy and Environmental Science*, 5, 5951 (2012). (IF: 25.427)
21. **Tapas K. Mandal** and Duncan H. Gregory; Hydrogen: Future energy vector for sustainable development, *Proceedings of the Institution of Mechanical Engineers, Part C, Journal of Mechanical Engineering Science*, 224(C3), 539 (2010). (IF: 0.730)
20. **Tapas Kumar Mandal**, Mark Croft, Joke Hadermann, Gustaaf Van Tendeloo, Peter W. Stephens and Martha Greenblatt;  $La_2MnVO_6$  Double Perovskite: A Structural, Magnetic and X-Ray Absorption Investigation, *Journal of Materials Chemistry*, 19, 4382 (2009). (IF: 8.262)
19. **Tapas K. Mandal** and Duncan H. Gregory; Hydrogen storage materials: present scenarios and future directions, *Annual Reports Section A (Inorganic Chemistry)*, 105, 21 (2009).
18. **Tapas Kumar Mandal**, Claudia Felser, Martha Greenblatt and Jürgen Kübler; Magnetic and electronic properties of double perovskites and estimation of their Curie

- temperatures by *ab initio* calculations, **Physical Review B**, 78, 134431 (2008). (IF: 3.718)
17. **Tapas Kumar Mandal**, Artem M. Abakumov, Maxim V. Lobanov, Mark Croft, Viktor V. Poltavets and Martha Greenblatt; Synthesis, Structure and Magnetic Properties of SrLaMnSbO<sub>6</sub>: A New B-site Ordered Double Perovskite, **Chemistry of Materials**, 20, 4653 (2008). (IF: 9.407)
  16. **Tapas Kumar Mandal**, Viktor V. Poltavets, Mark Croft and Martha Greenblatt; Synthesis, Structure and Magnetic Properties of A<sub>2</sub>MnB'O<sub>6</sub> (A = Ca, Sr; B' = Sb, Ta) Double Perovskites, **Journal of Solid State Chemistry**, 181, 2325 (2008). (IF: 2.265)
  15. Viktor V. Poltavets, Konstantin A. Lokshin, Mark Croft, **Tapas K. Mandal**, Takeshi Egami and Martha Greenblatt; Crystal structure of T'-type Ln<sub>4</sub>Ni<sub>3</sub>O<sub>8</sub> (Ln = La, Nd) nickelates, **Inorganic Chemistry**, 46, 10887 (2007). (IF: 4.820)
  14. **Tapas Kumar Mandal**, Artem M. Abakumov, Joke Hadermann, Gustaaf Van Tendeloo, Mark Croft and Martha Greenblatt; Synthesis, Crystal Structure and Magnetic Properties of Sr<sub>1.31</sub>Co<sub>0.63</sub>Mn<sub>0.37</sub>O<sub>3</sub>: A Derivative of the Incommensurate Composite Hexagonal Perovskite Structure, **Chemistry of Materials**, 19, 6158 (2007). (IF: 9.407)
  13. Rohini Mani, P. Selvamani, Joby E. Joy, J. Gopalakrishnan and **Tapas Kumar Mandal**; A Study of Ba<sub>3</sub>M<sup>II</sup>M<sup>IV</sup>WO<sub>9</sub> (M<sup>II</sup> = Ca, Zn; M<sup>IV</sup> = Ti, Zr) Perovskite Oxides: Competition between 3C and 6H Perovskite Structures, **Inorganic Chemistry**, 46, 6661 (2007). (IF: 4.820)
  12. **Tapas Kumar Mandal** and J. Gopalakrishnan; New route to ordered double perovskites: Synthesis of rock salt oxides, Li<sub>4</sub>MWO<sub>6</sub>, and their transformation to Sr<sub>2</sub>MWO<sub>6</sub> (M = Mg, Mn, Fe, Ni) via metathesis, **Chemistry of Materials**, 17, 2310 (2005). (IF: 9.407)
  11. **T. K. Mandal**, T. Sivakumar, S. Augustine and J. Gopalakrishnan; Heterovalent cation-substituted Aurivillius phases, Bi<sub>2</sub>SrNaNb<sub>2</sub>TaO<sub>12</sub> and Bi<sub>2</sub>Sr<sub>2</sub>Nb<sub>3x</sub>M<sub>x</sub>O<sub>12</sub> (M = Zr, Hf, Fe, Zn), **Materials Science & Engineering: B**, 121, 112 (2005). (IF: 2.331)
  10. **Tapas Kumar Mandal**, Saji Augustine, J. Gopalakrishnan and Ph. Boullay; Bi<sub>4</sub>LnNb<sub>3</sub>O<sub>15</sub> and (Ln = La, Pr, Nd) and Bi<sub>4</sub>LaTa<sub>3</sub>O<sub>15</sub>: New intergrowth Aurivillius related phases, **Materials Research Bulletin**, 40, 920 (2005). (IF: 2.435)
  9. **Tapas Kumar Mandal**, L. Sebastian, J. Gopalakrishnan, L. Abrams and J. B. Goodenough; Hydrogen uptake by barium manganite at atmospheric pressure, **Materials Research Bulletin**, 39, 2257 (2004). (IF: 2.435)
  8. Ramesh Sharma, **T. K. Mandal**, K. Ramesha and J. Gopalakrishnan; Synthesis and characterization of AgBiO<sub>3</sub> with the cubic KSbO<sub>3</sub> structure, **Indian Journal of Chemistry**, 43A, 11 (2004). (IF: 0.729)
  7. Y. G. Zhao, R. Fan, X. P. Zhang, H. Balci, S. B. Ogale, T. Venkatesan, **T. K. Mandal** and J. Gopalakrishnan; Insulator-metal transition and magnetoresistance of oxygen deficient La<sub>0.35</sub>Ca<sub>0.65</sub>MnO<sub>y</sub>, **Journal of Magnetism & Magnetic Materials**, 284, 35 (2004). (IF: 2.357)
  6. **Tapas Kumar Mandal** and J. Gopalakrishnan; From rocksalt to perovskite: A metathesis

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- route for the synthesis of perovskite oxides of current interest, *Journal of Materials Chemistry*, 14, 1273 (2004). (IF: 8.262)
5. Z. Serpil Gönen, **Tapas Kumar Mandal**, J. Gopalakrishnan, Bryan W. Eichhorn and Richard L. Greene; Novel  $ABO_3$  oxides related to perovskite and  $YAIO_3$  structure types in the La-B-V-O (B = Ni, Cu) systems, *Indian Journal of Chemistry, in Special Issue on Modern Inorganic Chemistry*, 42A, 2228 (2003). (IF: 0.729)
  4. J. Gopalakrishnan, Z. Serpil Gönen, K. -S. Chang, Ichiro Takeuchi, **T. K. Mandal**, Bryan W. Eichhorn, James C. Fettinger and Richard L. Greene; Synthesis and structure of  $La_{14}V_6CuO_{36.5}$ : A transparent Cu(I) vanadate containing  $[OCuO]^{3-}$  sticks, *Journal of Materials Chemistry*, 12, 3839 (2002). (IF: 8.262)
  3. **Tapas Kumar Mandal**, N. Y. Vasanthacharya and J. Gopalakrishnan; A novel metathesis route for the synthesis of  $La_2CuO_4$  and its superconducting analogues: Synthesis of a new lithium-substituted derivative of  $La_2CuO_4$ , *Journal of Materials Chemistry*, 12, 635 (2002). (IF: 8.262)
  2. Y. G. Zhao, W. Cai, J. Zhao, X. P. Zhang, R. Fan, B. S. Cao, M. H. Zhu, Tom Wu, S. B. Ogale, S. R. Shinde, T. Venkatesan, Q. Y. Tu, **T. K. Mandal** and J. Gopalakrishnan; Insulator-metal transition and magnetic properties of  $La_{0.5}Ca_{0.5}MnO_y$  induced by tuning the oxygen content, *Journal of Applied Physics*, 92, 5391 (2002). (IF: 2.101)
  1. G. Zhao, W. Cai, J. Zhao, X. P. Zhang, B. S. Cao, M. H. Zhu, L. W. Zhang, S. B. Ogale, Tom Wu, T. Venkatesan, Li Lu, **T. K. Mandal** and J. Gopalakrishnan; Electrical transport and magnetic properties of  $La_{0.5}Ca_{0.5}MnO_{3-y}$  with varying oxygen content, *Physical Review B*, 65, 144406 (2002). (IF: 3.718)

## Books / Book-Chapters

1. **Tapas Kumar Mandal** and Martha Greenblatt; *Transition Metal Oxides: Magnetoresistance and Half-metallicity*, in Contemporary Inorganic Materials, (eds. D. W. Bruce, D. O'Hare and R. I. Walton), Volume 2: Functional Oxides, John Wiley & Sons, 2010.

## Conference/Symposium/Meeting/Workshop

15. 18<sup>th</sup> CRSI National Symposium in Chemistry, Punjab University & INST, Mohali February 5-7, (2016). Nishant Gautam, Hariraj, Anjan Sil and **Tapas Kumar Mandal**; Poster: Novel Olivine type  $LiMnPO_4$ : Potential cathode materials for high voltage Li-ion battery.
14. Modern Trends in Inorganic Chemistry-XVI, Jadavpur University, December 3-5 (2015). Gollapally Naresh and **Tapas Kumar Mandal**; Poster: Sunlight-driven Selective Dye Degradation over New Sillen-Aurivillius Layered Perovskites.
13. International Conference on Emerging Materials and Applications (ICEMA'14), IIT Roorkee, Saharanpur Campus, April 5-6 (2014). Kamini Gupta, Gollapally Naresh and **Tapas Kumar Mandal**; Poster: Novel perovskites in the Pb-La-Ti-Fe-O system: Synthesis, characterization and visible-light photocatalysis.

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12. Modern Trends in Inorganic Chemistry-XV, IIT Roorkee, December 13-16 (2013). Gollapally Naresh and **Tapas Kumar Mandal**; Poster: *Novel transition metal incorporated Aurivillius phases  $Bi_{5-x}La_xTi_3FeO_{15}$  ( $x = 0 - 2$ ) as visible light photocatalysts.*
11. National Magnetic Resonance Society Symposium 2013 (NMRS 2013), IIT Bombay, February 3-6 (2013). Nishant Gautam, **Tapas Kumar Mandal**, Elumalai Viswanathan and Subramanian Ganapathy; Title of talk: *Synthesis, characterization and solid state NMR studies of two and three-dimensional lithium lanthanum/calcium titanates*
10. 49<sup>th</sup> Annual Convention of Chemists 2012 (organized by Indian Chemical Society), Dept. of Applied Sciences, NITTTTR, Bhopal, December 12-15 (2012). Rajiv Mistri, Sayantani Maiti, Jordi Llorca, **Tapas Kumar Mandal**, Bidhan Chandra Ray and Arup Gayen; Poster: *Selective oxidation of cyclohexane with hydrogen peroxide in presence of copper ion substituted spinel oxide substituted catalysts  $Cu_xM_{1-x}Al_2O_4$  ( $x = 0-0.07$ ;  $M = Mg, Mn, Fe, Ni, Zn$ ).*
9. Modern Trends in Inorganic Chemistry-XIV, University of Hyderabad, December 10-13 (2011). **Tapas Kumar Mandal**, Mark Croft and Martha Greenblatt; Poster: *Double Perovskites as Exotic Magnetic Materials: Synthesis of  $La_2MnVO_6$  and Future Challenges.*
8. Scottish Hydrogen and Fuel Cell Association Membership Meeting, University of St. Andrews, St. Andrews, UK, February 17 (2010). **Tapas Kumar Mandal**; Title of talk: *Solid-state hydrogen storage: the state of the art and potential solutions.*
7. ISIS Crystallography User Group Meeting, Abingdon, UK, November 5-6 (2009). **Tapas K. Mandal** and Duncan H. Gregory; Poster: *Hydrogen storage in the 1:1  $LiNH_2$ - $MgH_2$  system: An X-ray diffraction investigation.*
6. 42<sup>nd</sup> IUPAC World Chemistry Congress, SECC, Glasgow, UK, August 2-7 (2009).
5. Universities of Scotland Inorganic Conference (USIC), University of Strathclyde, Glasgow, UK, September 11-12 (2008).
4. 22<sup>nd</sup> Annual Symposium of the Laboratory for Surface Modification, Rutgers University, Piscataway, New Jersey, USA, February 15 (2008). **Tapas K. Mandal**, Viktor V. Poltavets, Mark Croft and Martha Greenblatt; Poster: *Synthesis and manipulation of low-dimensional transition metal oxides towards realization of novel electronic properties.*
3. Materials Research Society Symposium Proceedings Series, Volume 988E, November 28-30 (2006). Elisha Josepha, **Tapas Mandal** and John B. Wiley; Poster QQ9.19: *The Synthesis and Characterization of  $CsAeBiO_2Cl_2$  ( $Ae = Ca, Sr, Ba$ ).*
2. SSCU Silver Jubilee International Symposium on Solid State and Materials Chemistry, Indian Institute of Science, Bangalore, India, December 4-7 (2001).
1. *Winter School in Solid State and Materials Chemistry*, Jawaharlal Nehru Center for Advanced Scientific Research, Bangalore, India, 29 November 29 – December 4 (1999).