SHAMPA AICH **21st October, 2019**

1. EDUCATION

- **Ph.D** (Materials Science and Engineering): University of Nebraska, Lincoln, USA August 2005.
- **MS** (Metallurgical Engineering): University of Utah, Salt Lake City, Utah, USA, August 2003.
- **ME** (Metallurgical Engineering): Jadavpur University, Calcutta, India.
- **BE** (Metallurgical Engineering): Calcutta University, Howrah, India.

2. EMPLOYMENT

2.1. Academic/Research

1. **Professor:** Dept. of Metallurgical and Materials Engineering, Indian Institute of Technology (IIT), Kharagpur, India, December 2018 – Present.
2. **Associate Professor:** Dept. of Metallurgical and Materials Engineering, Indian Institute of Technology (IIT), Kharagpur, India, September 2013 – December 2018.
3. **Assistant Professor:** Dept. of Metallurgical and Materials Engineering, Indian Institute of Technology (IIT), Kharagpur, India, April 2008 – August 2013.
4. **Visiting Faculty:** Dept. of Metallurgical and Materials Engineering, Indian Institute of Technology (IIT), Kharagpur, India, August 2007 – March 1008.
5. **Post Doctoral Research Associate:** M.D.-ERL (Medical micro-Device Engineering Research Lab), Dave C. Swalm School of Chemical Engineering, Mississippi State University, Starkville, Mississippi State, USA, August 2006 – July 2007.
6. **Post Doctoral Research Associate:** CMRA (Center for Materials Research and Analysis) and College of Engineering and Technology, University of Nebraska-Lincoln, Lincoln, Nebraska, USA, June 2005 – July 2006.
7. **Research Assistant:** Dept. of Mechanical Engineering (Specialization in Materials and Chemicals), University of Nebraska-Lincoln, Lincoln, Nebraska, USA, May 2002 – May 2005.
8. **Research Assistant:** Dept. of Metallurgical Engineering, University of Utah, SLC, Utah, USA, Sept. 1999 – Dec. 2001.
9. **Research Assistant:** Dept. of Materials and Metallurgical Engineering, Indian Institute of Technology (IIT), Kanpur, India, May 1998 – April 1999.
10. **Teaching Assistant:** Dept. of Materials and Metallurgical Engineering, Indian Institute of Technology (IIT), Kanpur, India, May 1997 – April 1998.
11. **Tutor:** Sachdev College Tutorial Center, Calcutta, India, August 1995 – May 1996.

2.2. Industrial

12. **Quality Control Engineer:** Westing House Saxby Farmer Ltd., Calcutta, India, January 1990 – January 1993.
13. **Graduate Engineer Trainee:** Westing House Saxby Farmer Limited, Calcutta, India, January 1989 – December 1989.

3. REFEREED JOURNAL PUBLICATIONS (published)

1. V. Singha, A. Rao, A. Tiwari, P. Yashwanth, M. Lal, U. Dubey, **S. Aich** and B. Roy, "Study on the effects of Cl and F doping in TiO_2 powder synthesized by a sol-gel route for biomedical applications", *Journal of Physics and Chemistry of Solids*, 134, (2019), pp. 262-272.
2. K. Meghana, D. Satapathy, I.A. Al-Omari, T. Adhikary, **S. Aich**, "Microstructure and Magnetic Properties of Co-doped rapidly solidified $Ni_{50}Mn_{25-x}Co_xGa_{25}$ Heusler alloys", *Materials Letters*, 245, (2019), pp. 162-165.
3. Deepak Kumar Satapathy and **Shampa Aich**, "Time dependent nanomechanical properties of NiMnGa Heusler alloy", *Journal of Alloys & Compounds*, 788, (2019), pp. 10-20.
4. A. Rao, V. Singh, A. Tiwari, Y. Padarthi, NVM Rao, **S. Aich** and B. Roy, "Investigating the Effect of Dopant Type and Concentration on TiO_2 Powder Microstructure via Rietveld Analysis", *Journal of Physics and Chemistry of Solids* 113, (2018), pp. 164-176.
5. A. Behera, **S. Aich**, S. Ghosh, "Simulation of magnetron sputtered Ni/Ti thin film and the effect of annealing", *Emerging materials research* Volume 6 (2), (2017), pp. 254-259.
6. A. Behera, R. Suman, **S. Aich** and S. S. Mohapatra, "Sputter-deposited Ni/Ti double-bilayer thin film and the effect of intermetallics during annealing", *Surf. Interface Anal.*, 49, 2017, pp. 620–629.
7. A. Dey, **S. Aich**, S. Ghosh, S.S. Mohapatra, A. Kumar, A. Behera "Multi-scale modeling of deposition and re-sputtering of Ni_xTi_{1-x} thin film in a magnetron sputtering chamber", *Computer methods in Material Science*, Vol. 17, (2017), pp. 156-168.
8. B. Geetha Priyadarshini, **S. Aich**, M. Chakraborty, "Nano-crystalline Ni-Ti alloy thin films fabricated using magnetron co-sputtering: Effect of substrate conditions", *Thin Solid Films*, 616, (2016), PP. 733-745.
9. B. Singh, S. Ghosh, **S. Aich**, B.Roy, "Low temperature solid oxide electrolytes (LT-SOE): A review", *Journal of power source*, 339, (2017), pp. 103-135.
10. **S. Aich**, M.K. Mishra, C. Sekhar, D. Satapathy, B. Roy, "Synthesis of Al-doped Nano Ti-O scaffolds using a hydrothermal route on Titanium foil for biomedical applications", *Materials Letters*, Volume 178, (2016), pp. 135-139.
11. B. Roy and **S.Aich**, "Synthesis of Mixed-Phase TiO2 Powders in Salt Matrix and their Photocatalytic Activity", *Materials & Manufacturing processes*, Volume 31, (2016), 1628-1633.

12. A. Bhowmik, R. Malik, S. Prakash, T. Sarkar, M.D. Bharadwaj, **S. Aich**, S. Ghosh, "Classical molecular dynamics and quantum ab-initio studies on lithium-intercalation in interconnected hollow spherical nano-spheres of amorphous Silicon", *Journal of Alloys & Compounds*, Volume 665, (2016), pp. 165–172.

13. B.G. Priyadarshini, N. Esakkiraja, **S. Aich**, M. Chakraborty, "Resputtering effect on nanocrystalline Ni-Ti alloy films", *Metallurgical & Materials Transaction A*, Volume 47 (4), (2016), pp. 1751-1760.

14. A. Behera and **S. Aich**, "Characterization and Properties of magnetron sputtered nanoscale bi-layered Ni/Ti thin film and the effect of annealing", *Surface & Interface Analysis*, 47, (2015), pp. 805-814.

15. C. Shekhar, B. Roy and **S. Aich**, "Synthesis of Nanostructured Oxide-scaffold on Nitinol surfaces to improve Biocompatibility", *Surface Engineering* vol. 31, no. 10, (2015), pp. 747-751.

16. D. Roy, M. Gupta, S. Ghosh and **S. Aich**, "Bombardment of Ni and Ti atoms on Ni_xTi_{1-x} Thin Film under Negative Substrate Bias and its Effect on Film Deposition Rate and Film Crystallinity – Classical Molecular Dynamics Simulation and Experimental Validation", *International Journal of Current Research* (2015).

17. B. G. Priyadarshini, **S. Aich**, and M. Chakraborty, "Substrate bias voltage and deposition temperature dependence on properties of rf-magnetron sputtered titanium films on silicon (100)", *Bull. Mater. Sci.*, Vol. 37 (7), (2014), pp. 1691–1700.

18. B.G. Priyadarshini, **S. Aich** and M. Chakraborty, "On the microstructure and interfacial properties of sputtered Nickel thin film on Si (100)", *Bull. Mater. Sci.*, Vol. 37 (06), (2014), pp. 1265–1273.

19. B.G. Priyadarshini, M.K. Gupta, S. Ghosh, M. Chakraborty, and **S. Aich**, "Role of Substrate Bias during Deposition of Magnetron Sputtered Ni, Ti and Ni-Ti Thin Films", *Surface Engineering*, Vol. 29 (09), (2013), pp. 689–694.

20. D. Roy and **S. Aich**, "Effect of Sputtering Process Parameters on the Magnetron Sputtered Ni-Ti-Cu thin Films", *International Journal of Current Research*, Vol. 5 (01), (2013), pp. 075-079.

21. **S. Aich**, "Solar Energy Conversion – Chemical Aspects", Wiley-VCH, *Materials and Manufacturing Processes*, 28, (2013), p. 1276.

22. D. Roy and **S. Aich**, "Effect of Hafnium on Nickel-Titanium based Thin Film Coating by DC/RF Magnetron Sputtering Technique" *Journal of NanoScience, NanoEngineering & Applications*, Volume 2 (3), (2012).

23. D. Roy and **S. Aich**, "Effect of Film Residual Stress on the Crystallization Behaviour of Nickel-Titanium Based Sputtered Binary and Ternary Thin Film", *International Journal of Mechanics Structural*, Volume 3 (2), (2012), pp. 119-126.

24. B. Roy, P.A. Fuierer, and **S. Aich**, "Photovoltaic performance of dye sensitized solar cell based on rutile TiO_2 scaffold electrode prepared by a 2 step bi-layer process using molten salt matrices", *Materials Letters*, 65, (2011), pp. 2473-2475.

25. B. Roy, L. Li, and **S. Aich**, "Effect of salt composition on photovoltaic performance of the dye sensitized solar cells prepared from nano anatase TiO_2 powder using NaCl-$Na_2HPO_4.2H_2O$ salt matrices," *J. Mater. Sci.*, 46, (2011), p. 7611.

26. B. Roy, P.A. Fuierer, and **S. Aich**, "Synthesis of TiO_2 scaffold by a 2 step bi-layer process using molten salt synthesis technique", *Powder Technology*, 208, (2011), pp. 657-662.

27. B. G. Priyadarshini, **S. Aich**, and M. Chakraborty, "Structural and morphological investigations on DC-magnetron sputtered nickel films deposited on Si (100)", *J. Materials Science*, 46 (9), (2011), pp. 2860-2873.

28. S. Aich and J.E. Shield, "Effect of Wheel Speed on the Microstructures and Magnetic Properties of Rapidly Solidified Sm-Co Alloys", *Journal of Alloys and Compounds*, 502, (2010), pp. 63–67.

29. B. G. Priyadarshini, **S. Aich**, and M. Chakraborty, "An Investigation on Phase Formations and Microstructures of Ni-rich Ni-Ti Shape Memory Alloy Thin Films", *Metallurgical Transactions A*, 42 (11), (2011), pp. 3284-3290.

30. S. Aich, S. Das, I.A. Al-Omari, P. Algaraswamy, S. Ghoshchowdhury, M. Chakra borty, J.E. Shield, and D.J. Sellmayar, "Microstructure and Magnetic Properties of Rapidly Solidified $Ni_{54}Fe_{27-2x}Ga_{19+2x}$ Heuslar Alloys", *Journal of Applied Physics*, 105, (2009), pp. 1-3.

31. S. Aich, "Introduction to Materials Chemistry – H.R. Allcock", Wiley & Sons, in *Materials and Manufacturing Processes*, 24, (2009), pp. 709-710.

32. S. Aich and J. E. Shield, "A Study on The Order-Disorder Phase Transformations of Rapidly Solidified Sm-Co-based Permanent Magnets" *Journal of Magnetism and Magnetic Materials*, 313, (2007), pp. 76-83.

33. S. Aich and J.E. Shield, "Effect of Nb and C Additives on the Microstructures and Magnetic Properties of Rapidly Solidified Sm-Co Alloys", *Journal of Alloys and Compounds*, 425, (2006), pp. 416-423.

34. S. Aich and J.E. Shield, "Highly Coercive Rapidly Solidified Sm-Co Alloys", *J. Appl. Phys.*, 99, (2006), p. 08B521.

35. J.E. Shield, J. Zhou, **S. Aich**, V.K. Ravindran, R. Skomski and D.J. Sellmyer, "Magnetic Reversal in Three-Dimensional Exchange-Spring Permanent Magnets", *J. of Appl. Phys.*, 99, (2006), p. 08B508.

36. S. Aich, J. Kostogorova and J.E. Shield, "Magnetic Behavior of Sm-Co-based Permanent Magnets During Order/Disorder Phase Transformations", *J. Appl. Phys.*, 97, (2005), pp. 10H108 1-3.

37. J.E. Shield, V.K. Ravindran, **S. Aich**, A Hsiao and L.H. Lewis, "Rapidly Solidified Nanocomposite $SmCo_7$/fcc Co Permanent Magnets", *Scripta Materialia*, 52, (2005), pp. 75-78.

38. I.A. Al-Omari and **S. Aich**, "Magnetic and Structural Studies of $GdFe_{2-x}Hf_x$ Alloys", *J. Alloys and Compounds*, 375, (2004), pp. 31-33.

39. S. Aich and J.E. Shield, "Phase Formation and Magnetic Properties of $SmCo_{5+x}$ Alloys With The $TbCu_7$-type Structure", *J. Magnetism and Magnetic Materials*, 279, (2004), pp. 76-81.

40. A Hsiao, **S. Aich**, L.H. Lewis and J.E. Shield, "Magnetization Processes in Melt-Spun Sm-Co Alloys With The $TbCu_7$-type Structure", *IEEE Transactions On Magnetics*, 40, (2004), p. 2913.

41. S. Aich and K.S. Ravi Chandran, "TiB Whisker Coating on Titanium Surfaces by Solid-State Diffusion: Synthesis, Microstructure and Mechanical Properties", *Metallurgical and Materials Trans. A*, Vol. 33A, (2002), pp. 3489-3498.

4. PATENT

1. K.S. Ravi Chandran and **S. Aich**: "Integral Titanium Boride Coatings On Titanium Surfaces And Associated Methods", US Patent (U-3480), 2002.
2. A. Kumar, D. Roy, A.S. Ghosh and **S. Aich** "Thin film coating for preventing biofouling of submerged surfaces", Patent has been filed in IIT-KGP, 2013.

5. BOOK CHAPTER

1. **S. Aich** and B. Roy, "Titanium Oxide Nano- and Submicron-structured Coating for Ti and Ti Related Bio-implants", Ed:- A.K. Srivastava, "Oxide Nanostructures: Growth, Microstructures and Properties", Pan Stanford Publishing Pte. Ltd., CRC Press, Taylor & Francis Group, Singapore, (2014).
2. **S. Aich**, D.K. Satapathy and J.E. Shield, "Rapidly Solidified Rare-earth Permanent Magnets :: Processing, Properties and Applications", Ed:- Sam Zhang Shanyong, "Advances in Magnetic Materials: Processing, Properties, and Performance", CRC Press, Taylor & Francis, Boca Raton London New York, (2016).

6. CONFERENCE PROCEEDINGS (Paper/Publications)

1. Ajit Behera, **S. Aich**, Asit Behera, A. Sahu, "Processing and Characterization of magnetron sputtered Ni/Ti thin film and their annealing behaviour to induce shape memory effect", Materials Today: Proceedings- 4th International Conference on Materials Processing and Characterization 2 (2015) 1183 – 1192.
2. **S. Aich**, B. Geetha Priyadarshini, M. Gupta, S. Ghosh, and M. Chakraborty, "Formation of Crystalline and Amorphous Phases during Deposition of Ni_xTi_{1-x} Thin Film on Si Substrate – Interpretation of Experimental Results Using Molecular Dynamics Simulations", *Supplimental Proceeding: Materials Processing and Interfaces, Volume 1, Published online: 18th May 2012, Symposium Proceedings, 141ST TMS 2012 Annual Technical Meeting, Orlando, Florida, USA.*
3. B. Geetha Priyadarshini, **Shampa Aich**, Madhusudan Chakraborty, "Studies on Ni-Ti Thin Films grown by Bias Assisted Magnetron Sputtering", *Conference Proceedings, 140th TMS 2011 Annual Technical Meeting, San Diego, California,USA.*
4. **Shampa Aich**, Chandra Sekhar, Mrinal Mishra, "Nanostructured Bio-scaffold for Bone Implants, Stents: A Biomedical Evolution", *Collected Proceedings, 139th TMS 2010 Annual Technical Meeting & Exhibition, Seattle, WA, USA.*
5. **S. Aich** and J.E. Shield, "Structure and Properties of Rapidly Solidified Sm-Co Alloys", *Proceedings of 18th Workshop on HPMA (High Performance Magnets & their Applications) Workshop, Annecy (France), August 2004.*

7. CONFERENCE PROCEEDINGS/PRESENTATIONS (Oral Presentations)

1. International Conference ➔ 20 Oral Presentations.
2. National Conference ➔ 1 Oral Presentation.

8. CONFERENCE PROCEEDINGS (Abstracts for Poster Presentations)

International Conference ➔ 5 Poster Presentations

9. INVITED TALK

1. **Shampa Aich**, "Microstructure and Magnetic Properties of Rapidly Solidified Heusler Type Ferromagnetic Shape Memory Alloys", July 2010, Nebraska Center for Materials and Nanoscience, University of Nebraska, Lincoln, Nebraska, USA.
2. **S. Aich,** R. Mallik, T. Sarkar, A. Sinha, A. Panwar, M. Dixit Bharadwaj and S. Ghosh, "Microstructural and electrochemical characterization of $Li_3V_2(PO_4)_3$/C composite and $LiFePO_4$ synthesized by novel methods", EMSI 2013, Kolkata, India
3. **S. Aich,** S. Das, M. Vijaykumar, K. Kumar, M. Chakraborty, and J.E. Shield, "Rapidly Solidified NiFeGa(Al) and CoNiGa(Al) Ferromagnetic Shape Memory Alloys in Heusler Family", *NMD-ATM-2013*, November, Varanasi, India.
4. **S. Aich, "**Magnetron sputtered NiTi-based thin film shape memory alloys", CALM 2014, SSM University, Chennai, India.
5. **S. Aich** and A. Behera, "Multi-layered sputter deposited Ni/Ti thin film SMAs :: Solid state inter-diffusion and formation of intermetallics", FiMPART 2015, Hyderabad, India.
6. **S. Aich,** "Magnetic Materials and their Applications", Short Term Course on Advances in Materials 2019, NIT-Rourkela, Orissa, INDIA.

10. RESEARCH PROPOSAL SANCTIONED / FUNDED RESEARCH PROGRAM

(a) Sponsored Research Projects (Sanctioned):

S. No	Title	Sponsoring Agency and Officer Concerned	Period	Amount
1.	Development of prototype NdFeB magnet materials for making accelerator magnets	*Board of Research in Nuclear Sciences (BRNS), Mumbai, India*	3 Years since January 2020	Rs. 35,00,000/-
2.	Influence of layer configuration, annealing temperature and time on the microstructure, texture, and nano-indentation properties of NiTi shape memory alloy thin film produced by magnetron sputtered bi-layered and multi-layered Ni/Ti thin films.	*Council of Scientific and Industrial Research, CSIR complex, New Delhi, India*	3 years since February 2016	Rs. 19,00,000/-
3.	Ti/TiB_2 bi-layered and multi-layered Coating on Steel Substrate by Physical Vapor Deposition (PLD, sputtering) Techniques to Improve	*Council of Scientific and Industrial Research*, CSIR complex, New Delhi, India	4 years since August 2010	Rs. 25,00,000 /-

	Tribological Vapor Deposition (PLD, Sputtering) Techniques to Improve Tribological Properties (high wear/abrasion resistance, low friction coefficient) and Cutting Efficiency			
4.	Nanoscale Developments in a Co-based Heusler Type Co-Ni-Ga Ferromagnetic Shape Memory Alloy	*Institute Scheme for Innovative Research and Development (ISIRD) at IIT* (Indian Institute of Tech-nology), Kharagpur, India	2 years from January 2008	Rs. 3,50,000 /-
5.	Characterization of Metal-Silica Core-Shell Nanoparticles: An Electron Microscopy Study	*Department of Energy (DOE) Sustainable Energy Research Center (SERC) at MSU* (Mississippi State University), USA	6 months from February 2007	$6000, equivalent to Rs. 3,00,000 /-

11. HONORS/AWARDS/MERITS

1. **Winner (Topper) in Sigma-Xi Graduate Student Research poster competition**: "Synthesis & Characterization of SmCo-based Rapidly Solidified Melt-spun ribbons" University of Nebraska-Lincoln, Lincoln, Nebraska, April, 2004.
2. **National Scholar:** Calcutta University, India.
3. **Reviewer** of papers published in Journal of Applied Physics (Impact Factor - 3), Journal of Alloys and Compounds (Impact Factor – 2.135), Materials Letter (IF-2.322), Metallurgical & Materials Transactions (IF – 1.627), Materials Science & Engineering C (IF – 2.736).
4. **New Course developed in Solid State Physics:** Magnetism and Magnetic Materials
5. **Best Project Award achieved by a student:** Manoj Kumar Gupta (08MT3017), a dual degree student of mine.

12. STUDENTS SUPERVISION (IIT-Kharagpur)

1. **Doctoral:**
   - Geetha Priyadarshini, PhD, January 2012 (Topic:- Ni, Ti, and NiTi thin films).
   - Dibyendu Roy, PhD, August 2015 (Topic:- NiTi binary and Ni-Ti-X ternary thin films).
   - Ajit Behera, PhD, July 2016 (Topic:- Ni/Ti multi-layered thin films).

- Deepak Satapathy, PhD, expected 2020 (Topic:- Magnetic Shape Memory Alloys).
- Akila R, PhD, expected 2021 (Topic:-Rare-Earth Permanent Magnets).
- Akash Oreon, PhD, expected 2020 (Topic:- Hard magnets).
- Meghana Kinnera, PhD, expected 2021 (Topic:- Magnetic Shape Memory Alloys).
- M. Bharat Charan Gour, PhD, expected 2022 (Topic:- Shape Memory Alloys).
- Tapasendra Adhikary, PhD, expected 2022 (Topic:- Shape Memory Alloys).

2. **Masters:**
   - Already Graduated ➔ 19 M.Tech students (including Dual Degree).
   - 3 students, M.Tech, Expected in 2019.

3. **Bachelors:**
   - Already Graduated ➔ 30 B.Tech students (including Dual Degree).
   - 3 students B.Tech, Expected in 2019.

13. THEORY COURSES TAUGHT/TEACHING

- Diffusion in Metallurgical Processes – MT 62119
- X-ray Diffraction & Transmission Electron Microscopy – MT 33106, MT 31014.
- Materials' Characterization – MT 6004, MT 43010 & MT 31012,
- Defects & Diffusion in Crystalline Solids – MT 31018.
- Solidification Processing – MT 60021, MT 61141.
- Casting & Solidification - MT 41039.
- Magnetism & Magnetic Materials – MT60148.

14. LABORATORY COURSES TAUGHT/TEACHING

- Electron Microscopy in Materials Science and Engineering – METL 471/871, University of Nebraska-Lincoln, USA, Spring 2006.
- X-ray Diffraction and Electron Microscopy - MT690009,.
- Phase Transformation and Heat Treatment - MT34005.
- Materials' Characterization – MT 43010.
- X-ray Diffraction & Transmission Electron Microscopy – MT 33106, MT 39006.
- Introduction to Engineering Materials – MT 29007.
- Materials' Characterization - MT 31012.

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15. CONTRIBUTION TO INSTITUTE/DEPARTMENT

1. WARDEN in Rani Laxmi Bai Hall of Residence (RLB) since March 2019 – February 2021

2. WARDEN in Sir Ashutosh Mukherjee Hall of Residence (SAM) since July 2013 – June 2015.
3. Assistant Warden in SN/IG Hall of Residence ➔ 2009-2011
4. Co-convener in COMPOSITE ➔ 2009/2010
5. Anti Ragging Vigilance Duty ➔2008 & 2009

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