CURRICULUM VITAE (Updated-March, 2014)



### 1. Name: Dr Abhijit De

### 2. Present status & earlier institutes:

#### West Bengal State University (WBSU)

From:- **April 2013 – till date** - Head & Associate Professor, Department of Physics, Taki Government College, Taki, Dist.- North 24 Paraganas, West Bengal, Pin-743429, Phone:03217 234474 & Fax:03217 234566

From: - *Feb 2002 till April 2013* at Presidency College (presently Presidency University, Kolkata), 86/1 College Street, Kolkata-700 073, WB, India. Phone: +91(033)22411977

From: - **July 1996 till Jan 2002** - Joined West Bengal Educational Services, as Lecturer-in-Physics at A.B.N. Seal College, Coochbehar, West Bengal.

#### 3. Residential address:

BE-176, Sector I, Salt Lake, Kolkata, West Bengal Pin-700064 Phone: +91 [0] 33 23343261 E-mail: <u>abhijitde61@gmail.co</u>m, adebe2961@yahoo.co.in

4. Date of Birth: December 22, 1961; Nationality: Indian

#### 5. Academic gualification

- (i) B. Sc. (Physics Hons.), First Class, 1983, M.S. University of Baroda, Baroda, Gujarat,
- (ii) M. Sc. (Electronics & Radio Physics), First Class, 1985, M.S. University of Baroda, Gujarat
- (iii) Common Exam for Research Admission (CERA), 1985, Conducted by I I T, Madras
- (v) Ph.D. (Materials Science),

Work done at Indian Association for the Cultivation of Science (IACS), Calcutta, India. Thesis title: *Study of Amorphous Silicon Alloys and Transparent Conducting Oxide Thin Films.* 

Degree awarded by the University of Calcutta, Calcutta in 1992.

(iv) Post Graduate Diploma in Operations Management, 1995, IGNOU, Delhi; Center: Kolkata

# 6. Postdoctoral Experiences:

(a) <u>June 1992-October 1994:</u> Research Associate, at Energy Research Unit, Indian Association for the Cultivation of Science, Kolkata-700032, India.

(b) *January 1993-September 1993:* UNDP / UNIDO fellow, Visiting Research Associate at the Faculty of Engineering, Department of Electrical and Electronic Engineering, O-okayama, Meguro-ku, Tokyo 152, Japan

(c) <u>October 1994-July 1995:</u> Research Associate, Fellowship by CSIR, Govt. Of India, at, Energy Research Unit, Indian Association for the Cultivation of Science, Kolkata-700032, India.

(d) *July 1995-July 1996:* Senior Research Associate (Pool Officer), Pool Scheme-CSIR, Govt. Of India, at, Energy Research Unit, Indian Association for the Cultivation of Science, Kolkata-700032, India.

(e) <u>April-May 1992, Nov-Dec 1993, Jan-Feb 1994 and August 1995</u>: Visiting Research Associate at BHEL Amorphous Silicon Solar Cell Pilot Plant, Gurgaon from ERU, IACS, Kolkata.

# 7. Teaching experiences:

(A) Undergraduate [B.Sc.(Honours+General)] teaching experiences (Theory and Laboratory) in Acoustics, General Properties of Matter, Electricity-Magnetism, Electronics, Solid State Physics, Optics, Thermal Physics, at A.B.N Seal College, Coochbehar, WB (July 1996-Feb 2002), Presidency College (Feb 2002-March 2013), Kolkata and Taki Government College, Taki, West Bengal (April 2013-till date).

(B) Post-graduate (M. Sc.) teaching experience (Theory and Laboratory) in Materials Physics (Advance Course) /Solid State/Condensed Matter Physics at Presidency College (Feb 2002-March 2013), Kolkata and Barasat Government College, Barasat, West Bengal (June 2013-till date).

8. <u>Invited talks</u>: International Conference: 'Assembly of Magnetic Nanoparticles in Polymer Matrix', 3<sup>rd</sup> Thailand Nanotechnology Conference 2009 – Health, Energy, Environment, (21-22 December 2009), Asian Institute of Technology, Bangkok, Thailand.

# 9. Academic - Research

(a)Reviewer of research papers - International Journal of Physical Sciences (IJPS), <u>www.academicjournals.org/IJPS</u>, and Journal of Petroleum Technology & Alternate Fuels (JPTAF).

(b) External Examiner of Ph.D. Thesis (2013) – Title of Thesis – 'Synthesis, Characterization and Study of Influence of Alkaline Earth / Transition Metal Dopants in  $TiO_2$  Nanoparticles' by Mehul Hasmukhlal Mangrola, Faculty of Science, Department of Physics, Veer Narmad South Gujarat University, Surat, Gujarat, India.

# 10. Recognitions/Honors/Memberships:

(a) Resource Person – Since (2010) - INSPIRE, DST, Govt of India.

(b) Senior Mentor – (2008) - Dr D. S. Kothari Post Doctoral Fellowship of UGC – For Dr Namita Dutta Gupta, Research Associate.

(c) Teachers Data Base – Since (2003) - Indian Academy of Sciences, Bangalore.

(d) Life Member of – Materials Research Society of India (MRSI), Bangalore; Solar Energy Society of India (SESI), Delhi; Indian Association of Physics Teachers (IAPT), Kanpur; Indian Association for the Cultivation of Science (IACS), Kolkata.

# 11. Seminars/Symposia attended:

### (a) Papers presented at the International Conferences

1) **De A** (2009) 'Assembly of Magnetic Nanoparticles in Polymer Matrix', 3<sup>rd</sup> Thailand Nanotechnology Conference 2009 – Health, Energy, Environment, (21-22 December 2009), Asian Institute of Technology, Bangkok, Thailand.

2) Sahu K R, **De A**, Chakraborty K R and De U (2008), Preparation of  $PbNb_2O_6$  and FTIR Characterization, International Conference on Inorganic Materials – INOR2008 – Dresden, Germany (28 – 30 September 2008) – Poster Presentation.

3) **De A** (2006), Structural aspects of polymer coated metal oxide nanomaterials. Proceedings of International Conference on Lasers and Nanomaterials, SINP, Kolkata – (Nov 30 to Dec 2, 2006) – Poster Presentation.

4) **De A** (2004), Low-molecular-weight polymer based Nanostructured Ferrite Materials. International Conference on Nano-Materials: Synthesis, Characterization and Applications; Kolkata, India (4-6 November, 2004) – Oral Presentation.

#### 5) **De A** (2003)

Towards development of nanostructured ferrite and related materials. International Conference on Nano-Science and Technology, Organized by DST, Govt. of India (Dec'2003), Kolkata - Poster Presentation.

6) Wenas W.W., **De A**., Yamada A., Konagai M. and Takahashi K.,(1993) Optimization of ZnO Films for Front and Rear Contacts in a-Si Solar Cells. 7th International PVSEC, Nagoya, Japan (Nov 1993) – Poster Presentation.

7) **De A**, Ghosh S, Ray S and Barua AK.,(1992), Boron Doped Microcrystalline Hydrogenated Silicon Films Prepared by Photo - CVD for Photovoltaic Applications, 6th International Photovoltaic Science & Engineering Conference (PVSEC), New Delhi (Feb 1992) - Oral Presentation.

8) **De A**, Ray S and Barua AK.,(1987), Annealing Effects on Properties of R.F. Reactive Magnetron Sputtered  $SnO_2$  Films, 7th International Conference on Thin Films, New Delhi (Dec, 1987) - Poster Presentation.

# (b) Papers presented at the National Conferences / Symposiums

1) **De\*A.** and Bhattacharjee A.,(2010) 'Variation of Molecular Structure in Magnetic Phase Transitions', Book of Abstracts, Condensed Matter Days(CMDAYS10) – Symposium on Condensed Matter Physics,(25<sup>th</sup> – 27<sup>th</sup> August 2010), organized by Department of Physics, University of Kalyani, Kalyani – 741 235 - Oral Presentation\*.

2) Gupta\*N. D., S.K. Chaudhuri, K.R. Sahu, D. Das, **De A.**, and U. De, 'Defect identification by positron lifetime in differently fired BaTiO<sub>3</sub> polycrystals', Condensed Matter Days(CMDAYS 09) – Symposium on Condensed Matter Physics, ( $26^{th} - 28^{th}$  August 2009), organized by Department of Physics, Jadavpur University, Jadavpur, Kolkata – 700 032 - Poster Presentation\*.

3) Sahu\*K.R., Chaudhuri S.K., **De A.**, Duttagupta N., Das D., Chakraborty K.R., and De U.,(2009) 'Positron annihilation and FTIR characterization of piezoelectric and non – piezoelectric Lead Meta-Niobate', Condensed Matter Days(CMDAYS09) – Symposium on Condensed Matter Physics,(26 – 28<sup>th</sup> August 2009), organized by Department of Physics, Jadavpur University, Jadavpur, Kolkata – 700 032 - Poster Presentation\*. 4) **De\*A.**, Prasad S.G., De U.,(2009) 'Molecular Structure Variation of Gamma Irradiated PET Polymer Films', Condensed Matter Days(CMDAYS09) – Symposium on Condensed Matter Physics, (26 – 28<sup>th</sup> August 2009), organized by Department of Physics, Jadavpur University, Jadavpur, Kolkata – 700 032 - Oral Presentation\*.

5) DuttaGupta\* N., Sahu K., Das I., **De A** and De U, (2008), Synthesis and study of electro – active nano – particles and their polymer composites for novel applications. CMDAYS08-Symposium on Condensed Matter Physics, Organized by Department of Physics, Visva – Bharati, Santiniketan, West Bengal; – Oral Presentation.

6) **De A**, Sahu K R, Chakravorty K R and De U, (2008), FTIR Basics and Applications to Inorganic Materials and Polymers. CMDAYS08-Symposium on Condensed Matter Physics, Organized by Department of Physics, Visva – Bharati, Santiniketan, West Bengal; – Oral.

7) **De A** (2005) Structural Properties of Nano-structured Iron and Zinc Oxide using Low Molecular Weight Polymers. CMDAYS05- Symposium on Condensed Matter Physics, Organized by Dept. of Physics, Berhampur University, Berhampur, Orissa; – Poster Presentation.

8) **De A** (2003) Sol-Gel Route to Develop Nano-structured Ferrite and Related Materials. CMDAYS03 - Symposium on Condensed Matter Physics, Organized by Dept. of Physics, Jadavpur University, Kolkata - Oral Presentation.

9) Iftiquar S.M., Das D, **De A** and Barua A.K.,(1995) Properties of Silicon - Oxygen Alloy Films Prepared from SiH<sub>4</sub> + CO<sub>2</sub> Gas Mixture, Solid State Physics Symposium (SSPS), Indian Association for the Cultivation of Science (IACS), Calcutta (Dec, 1995) - Poster Presentation.

10) Das D, Iftiquar S.M., **De A** and Barua A.K., (1995) Intrinsic and Boron Doped a-SiO: H Films Prepared by R.F. Glow Discharge, SSPS, IACS, Calcutta (Dec, 1995) - Poster Presentation.

11) **De A** (1994) Surface Morphology of ZnO Films Grown by Metal Organic CVD (MOCVD) at Low Temperatures, 5th Annual General Meeting of Materials Research Society of India (MRSI), Hyderabad (Feb, 1994) - Poster Presentation.

12) **De A,** Sukriti Ghosh, Swati Ray and AK. Barua (1991), Development of P - Type Microcrystalline Silicon Films by Photo - CVD. SSPS, Benaras Hindu University (BHU), Varanasi (Dec, 1991) - Poster Presentation.

13) **De A** (1991) Thesis Presentation (Oral) - Study of Amorphous Silicon Alloys and Transparent Conducting Oxide Thin Films. SSPS, BARC, Bombay.

# 12. Brief description of research facility and project activities:

#### (a) Introduction of Materials Physics as M.Sc. (II) Advance Course – Theory and

**Laboratory** – It was my privilege to introduce and establish an Advance Course on Materials Physics (Theory and Laboratory) in the year 2003 at the Department of Physics, Presidency College, Kolkata (Presently Presidency University, Kolkata) with earnest co-operation from the Head and other departmental members (Prasangiki 2003, Presidency College, Kolkata) which continued thereafter. From year 2010, a combined course on Condensed Matter and Materials Physics for the Advance Course – M.Sc. II was commenced and continuing thereafter. During 2004-06 funds under DST-FIST Program encouraged me to procure Spectrum RX I FTIR Spectrometer (Perkin Elmer) and set up an Advance Laboratory. Research activities on polymer based ferrite materials and other metal compounds were done and later published. The materials which have been studied so far are – polymer based iron oxide (grown using Sol- Gel method), silicon, germanium, and carbon thin films (grown using Ion-Cluster Beam Method); Polyethylene Terephthalate (PET) sheets, lead meta-niobate pellets, zinc oxide films, molecular ferrimagnets and other compounds.

A collected review work on polymer based magnetic materials was compiled (2006) which got published in the form of a chapter in an international handbook (Springer, USA - 2009). During the tenure from 1986 till 1996 my main research activities were development (Preparation

Sputtering, Photo and Plasma Chemical Vapor Deposition, Metal Organic CVD; Characterization
XRD, FTIR, ESR, SIMS, Electrical, and Optical properties) of Amorphous Silicon – Germanium and related alloy material along with transparent oxide thin films for the development of low cost large area application of solar cells (photovoltaic devices). Sputtering, Photo – Chemical Vapor Deposition methods were used to grow thin films onto various substrates. During 1994 – 1996, Metal – Organic Chemical Vapor Deposition Unit was developed to grow and study thin films of silicon, germanium, carbon alloys and tin / zinc based oxides for photovoltaic application at Energy Research Unit, Indian Association for the Cultivation of Science, Kolkata.

# (b) Projects-

(a) **Research Level** – Status: Individual - UGC Minor Project (F-FSW-028 / November 2002)-"Development of Ferrites and Study of their Properties" (2002 – 2004) (INR 50,000/-). The research work was successfully completed.

(b) Undergraduate Level -KVPY, DST Projects - (Summer Programme)

Name of Student – Arnab Basak –

(i) 2008 - 2nd Year Honors – Topic: "A Comparative Study of Magnetic Properties produced by Iron-core Solenoid and Permanent Bar Magnet using Deflection Magnetometer".

(ii) 2009 - 3rd Year Honors – Topic: "Investigation and Calculation of Molecular Bonding Characteristics of a Tri-atomic Molecule ( $CO_2$ ) using Fourier Transform Infrared Spectroscopy".

(iii) 2010 - 1st Year M.Sc. at IIT, Kharagpur – Topic: "Study of Thin Films & Quantum Dots".

# 13. Publications

#### (A) List of Publications (Peer Reviewed)

1) Prasad S G, **De A.** and De U. (2011) 'Structural and Optical investigations of radiation damage in transparent PET polymer films', International Journal of Spectroscopy, volume 2011, Article ID 810936, pp1-7, DOI:10.1155/2011/810936.

2) Chakraborty K R., Sahu K R, **De A.**, and De U (2010) 'Structural characterization of orthorhombic and rhombohedral lead meta-niobate samples. Integrated Ferroelectrics: An International Journal, volume 120, issue 01, pp-102-113, DOI:10.1080/10584587.2010.503804.

3) Bhattacharjee A., Roy D., Roy M., Chakraborty S., **De A.,** Kusz J., and Hofmeister W.; (2010) Rod – like ferrites obtained through thermal degradation of molecular ferrimagnet, Journal of Alloys and Compounds, volume 503, pp 449 – 453,DOI:10.1016/j.jallcom.2010.05.031.

4) Dutta Gupta N., Sahu K.R., Das I., **De A.,** and De U.; (2010) Synthesis and study of electroactive nanoparticles and their polymer composites for novel applications, Indian Journal of Physics, volume 84, number 10, pp1413 – 1419; DOI:10.1007/s12648-010-0133-9 (Published by Springer).

5) **De A** (2004), Low-molecular-weight polymer based Nanostructured Ferrite Materials. Proceedings of International Conference on Nano-Materials: Synthesis, Characterization and Applications; Kolkata, India (4-6 November, 2004) pp 496-498 (Published by Tata McGraw-Hill Publishing Co.Ltd.), ISBN 0-07-059717-0.

6) Wenas W. W., **De A.**, Yamada A., Konagai M. and Takahashi K.; (1994) Optimization of ZnO for front and rear contacts in a-Si solar cells; Solar Energy Materials and Solar Cells, vol 34, pp 313 – 319, SSDI 0927-0248(94)00047-V,Elsevier Science B.V.

7) Ray S, Ghosh S, **De A**. and Barua A. K.; (1994) Improved quality a-S1C: H films prepared by photo chemical vapour decomposition of silane and acetylene. Solar Energy Materials and Solar Cells, vol 33, pp 517 – 531, SSDI 0927-0248(94)00155-L, Elsevier Science B.V.

8) Ghosh S, **De A** and Ray S; (1994), Microcrystalline silicon carbon alloy film prepared by photo - Chemical Vapour Deposition. Thin Solid Films, vol 245, pp 249-254, SSDI 0040-6090(93)02979, Elsevier Sequoia.

9) Banerjee R, **De A.**, Ray S, Barua A.K. and Reddy S.R.; (1993), Hydrogen plasma degradation of SnO films prepared by APCVD method, J. Phys. D: Applied Physics, vol 26, pp 2144 – 2147, 022-3727/93/122144+04\$07.50, IOP Publishing Ltd, UK.

10) **De A.**, Ray S and Barua A.K. (1993), Effect of deposition parameters on the properties of amorphous silicon - germanium alloy film grown by the photo-CVD method. Thin Solid Films, vol 229, pp 216-222, 0040-6090/93/\$6.00, Elsevier Sequoia.

11) **De A**, Ghosh S, Ray S and Barua A. K.; (1992) Boron doped microcrystalline hydrogenated silicon films prepared by photo-CVD for photovoltaic applications. Proceedings 6<sup>th</sup> International Photovoltaic Science and Engineering Conference (PVSEC) New Delhi; pp 73-78, ISBN 81-204-0679-6.

12) **De A**, Ghosh S and Ray S; (1992) Boron doped hydrogenated amorphous silicon films prepared by photo-C VD, Solar Energy Materials & Solar Cells, vol 26, pp 137 – 147, 0927-0248/92/\$05.00, Elsevier Science Publishers B.V., North Holland.

13) Ghosh S, **De A**, Ray S and Barua A. K.; (1992), Role of hydrogen dilution and diborane doping on the growth mechanism of p-type microcrystalline silicon films prepared by photo-C VD. Journal of Applied Physics, vol 71, pp 5205-5211, 0021-8979/92/105205-07\$04.00, AIP.

14) **De A** and Ray S; (1991), A study of the structural and electronic properties of magnetron sputtered tin oxide films. Journal of Physics D: Applied Physics, vol 24, pp 719 – 726, 0022-3727/91/050719+08 \$ 03.50, IOP Publishing Ltd, UK.

15) **De A**, Ganguly G, Ray S and Barua A. K.; (1990), Influence of chamber pressure on hydrogen bonding configuration in a-SiGe: H films by photo-CVD. Japanese Journal of Applied Physics, vol 29, pp 2365-2370.

16) **De A**, Ray S and Barua A.K.; (1990), Effect of deposition parameters on the properties of hydrogenated amorphous silicon films prepared by photo-chemical vapour deposition.; Solar Energy Materials, vol 20, pp 139-148.

17) **De A**, Ray S and Barua AK.,(1988), Annealing Effects on Properties of R.F. Reactive Magnetron Sputtered  $SnO_2$  Films, Thin Solid Films, vol 164, page 537, 0040-6090/88/\$3.50 Elsevier Sequoia.

# (B) Other publications:

1) **International Handbook** – Pal M and **De A**, (2009) Chapter 11 – 'Polymer – Iron Oxide based Magnetic Nanocomposites' in 'Handbook on Hybrid Nanocomposites for Nanotechnology: Electronic, Optical, Magnetic, and Bio / Medical Applications'; Editor: Lhadi Merhari, CERAMEC, France – SPRINGER – VERLAG (Printed in USA), pp 455 – 506, DOI:10.1007/b137368, ISBN 978-0-387-72398-3(Print) 978-0-387-30428-1(Online).

2) **De A** (2005) Adaptability to phenomenological changes, Published E-Letter response in SCIENCE – <u>http://www.sciencemag.org/cgi/eletters/309/5742/1789</u> (American Association for the Advancement of Science).

# 14. Research Collaborations:

### (A) Ongoing activities – (2012-till date)

Research activities on Semiconductor Thin Films – Fabrication, Charcterisation & Applications with Dr Kamlesh Raval, Department of Electronics, Narmada College of Science & Commerce, Zadeshwar, Bharuch, Gujarat.

### (B) Completed activities – (2003-2013)

(i) Research work on Radiation (gamma rays) induced damage in PET sheets using optical, infrared spectroscopy and XRD with Prof. Udayan De (VECC, Kolkata and Professor, Homi Bhabha National Institute, Mumbai) and S G Prasad (UTTI, Kanpur).

(ii) Research activities on Structural changes in Lead meta-niobate piezoelectric materials with Prof. Udayan De (VECC, Kolkata and Professor, Homi Bhabha National Institute, Mumbai) and Kriti Ranjan Sahu (Egra College, Purba Medinipur, West Bengal).

(iii) Research work on Structure and Magnetic Properties of Molecular Ferrimagnets and related nanomaterials with Dr Ashis Bhattacharjee, Department of Physics, Visva Bharati University, Santiniketan, West Bengal.

(iv) Some preliminary research work on FTIR spectroscopy of germanium thin films on silicon substrates and related nano-materials along with Dr Arabinda Nayak, Department of Physics, Presidency College, Kolkata.

(v) Initial activities on porous silicon and oxide materials along with Dr Subhankar Ghosh, Department of Physics, St. Xaviers College, Kolkata.

#### 15. Areas of Interest

(i) Polymer based magnetic, semiconducting nanomaterials / nanocomposites and related areas.

- (ii) Magnetic, dielectric, optical and piezoelectric Materials.
- (iii) Nanomaterials and nanostructures.
- (iv) Electroactive nanoparticles, their polymer composites and applications.
- (v) Amorphous semiconductors and related materials for Photovoltaic & Energy applications.
- (vi) Materials related to Biophysics.