Dr. Ashwini Kumar

Curriculum Vitae

A-403, Postdoctoral Building,
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Jiangsu province, CHINA

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Date & place of Birth: 18 March1984, Bhiwani, Haryana, India.

AREAS OF RESEARCH INTEREST

- Understanding structure property correlations in multiferroic and magnetoelectrics
- Engineering multiferroic or magnetoelectric properties close to room temperature aiming memory device application.
- Study of structural (using Rietveld refinement) and physical properties.
- Ceramics synthesis, Spinel ferrite, $BiFeO_3$, $YMnO_3$, Hexaferrites etc.

EDUCATION

2015-till **Post Doctoral Fellow**
Title: ***"Nanostructured composite materials with strain mediated magnetoelectric (ME) coupling"***
Mentor: *Prof. Qi Li*
Department of Physics, Southeast University, Nanjing, Jiangsu Provience, China

2011-14 **Doctor of Phillosophy (Physics)**
Title: ***"Investigation of structural, electrical and magnetic properties of some multiferroic materials"***
Supervisor: *Prof. Dinesh Varshney*
School of Physics, Devi Ahilya University, Indore, India

2010-11 **Master of Phillosophy (Physics)**
Title: ***"Structural and dielectric study of Sr-doped $BiFeO_3$ multiferroics"***
Supervisor: *Prof. Dinesh Varshney*
School of Physics, Devi Ahilya University, Indore, India

2005-07 **Master of Science (Physics – Materials Science)**
Title: ***"Synthesis and chracterization of doped $YBa_2Cu_3O_{7-\delta}$ superconductors"***
Supervisor: *Prof. Dinesh Varshney*
School of Physics, Devi Ahilya University, Indore, India

TECHNICAL SKILLS

Comprehensive knowledge and expertise in

- Synthesis of multiferroic, ferrite (magnetic) materials, ferroelectric materials and their composites by ceramic method and chemical method,
- Impedance spectroscopy, Dielectric and Electrical measurements.
- Magnetostriction measurement
- Ferroelectric behavior of Piezo/ferro ceramics
- Magnetoelectric effect

OTHER ACHIEVMENTS

1. Awarded Research and Project Fellowship from UGC-DAE CSR, Indore, India, since 2009.
2. X-ray diffraction data on Zn and Mg substituted $CoFe_2O_4$ ferrites published in J. *Alloys Compd.* 526: 91 (2012) has been accepted for **JCPDS Cards by International Centre for Diffraction Data (ICDD)**.
3. X-ray diffraction data on Sr^{2+} doped $BiFeO_3$ multiferroic materials published in *Journal of Molecular Structure* 1038: 242 (2013) has been accepted for **JCPDS Cards by International Centre for Diffraction Data (ICDD)**. Reference # 31425
4. X-ray diffraction data on Nd^{3+} doped $BiFeO_3$ multiferroic materials published in *Ceramics International*, 38, 3935-3942 (2012) is invited for publication in **International Centre for Diffraction Data (ICDD)**.

KEY ACHIEVEMENTS

- 15 Publications in SCI international journals
- > 20 Oral / Poster paper presentations in workshop / symposia / conferences

RESEARCH

Research areas

Multiferroic; Mixed spinel ferrite; Crystal growth; Solid state reaction route and Chemical processes *i.e.* co-precipitation and Sol-gel methods; Characterization of polycrystalline; Powder X-ray Diffractometry (PXRD); Correlation of physical properties with crystalline perfection/ defects.

Experimental techniques used

Solid state reaction route and Chemical processes *i.e.* co-precipitation and Sol-gel methods for polycrystalline ceramics; Powder X-ray diffraction; Fourier transform infrared (FTIR) spectrometer; Raman spectrometer; Impedance spectroscopy; Ferroelectric (P-E) loop analyzer; Magnetic measurement (VSM); Scanning electron microscopy (SEM) Differential Scanning Calorimetry (DSC).

Research skills

- Expertise in materials synthesis, crystallization by solid state reaction route and Chemical processes *i.e.* co-precipitation and Sol-gel method.
- Expertise in the structural investigation of crystalline materials by powder X-ray diffraction
- **FullPROF** "Rietveld Refinement by FullPROF - X-ray Diffraction technique Refinement Software"
- GSAS "General Structure Analysis System" Rietveld refinement - XRD data Refinement Software
- MatheMatica, MathCAD Professional, MATLAB
- Experienced in Microsoft office (MS word, Excel, Power point), Origin, and LaTex

RESEARCH RESULTS

In Peer Reviewed Journals †

S.N.	Author(s), Title, Journal name, vol., page, year of publication	Impact factor	Cited by
1	Dinesh Varshney, Ashwini Kumar, "Structural and optical properties of Ni substituted $CaCu_3Ti_{4-x}Ni_xO_{12}$", *Optik* (Elsevier) 126: 3437 **(2015)**	0.677	00
2	**Ashwini Kumar**, Dinesh Varshney, "Structural transition and enhanced ferromagnetic properties of La, Nd, Gd, and Dy-doped $BiFeO_3$ ceramics" *Journal of Electronic Materials* 44: 4354-4366 **(2015)**	1.798	02
3	Poorva Sharma, **Ashwini Kumar**, Dinesh Varshney, "Enhanced magnetic response in single-phase $Bi_{0.80}La_{0.15}A_{0.05}FeO_{3-\delta}$ (A=Ca, Sr,Ba) ceramics" *Solid State Communications* 220: 6-11 **(2015)**	1.897	02
4	D. Varshney, Poorva Sharma, **Ashwini Kumar,** "Room temperature structure vibrational and dielectric properties of Ho modified $YMnO_3$", *Materials Researsh Express* (IOP) 2: 076102 **(2015)**	IOP	02
5	**Ashwini Kumar,** Poorva Sharma, Dinesh Varshney, " Structural and ferroic properties of $Bi_{0.8}RE_{0.2}FeO_3$ (*RE* = La, Nd, and Dy) ceramics", *Journal of Ceramics* (Hindawi) 2015: 1-8 **(2015)**	Hindawi	01
6	**Ashwini Kumar**, Poorva Sharma, Dinesh Varshney , "Structural, vibrational and dielectric study of spinel ferrites: $Co_{1-x}Ni_xFe_2O_4$ (x = 0.0, 0.5, 1.0)", *Ceramics International* 40: 12855 (**2014**)	2.086	15
7	Dinesh Varshney, **Ashwini Kumar**, "Structural, Raman and dielectric behavior in $Bi_{1-x}Sr_xFeO_3$ multiferroics", *J. Molecular Structure* 1038: 242 (**2013**)	1.599	19
8	Kavita Verma, **Ashwini Kumar,** Dinesh Varshney, " Effect of Zn and Mg doping on structural, dielectric and magnetic properties of tetragonal $CuFe_2O_4$", *Current Applied Physics*, 13: 467 (**2012**)	2.026	21
9	**Ashwini Kumar,** Dinesh Varshney, " Crystal structure refinement of $Bi_{1-x}Nd_xFeO_3$ multiferroic by the Rietveld method", *Ceramics International*, 38: 3935 (**2012**)	2.086	45
10	Kavita Verma, **Ashwini Kumar,** Dinesh Varshney, " Dielectric relaxation behavior of $A_xCo_{1-x}Fe_2O_4$ (A = Zn, Mg) mixed ferrites", *J. Alloys and Compounds*, 526: 91 (**2012**)	2.726	36

11	Dinesh Varshney**, Ashwini Kumar,** Kavita Verma, "Effect of *A*-site and *B*-site doping on structural, thermal, and dielectric properties of $BiFeO_3$ ceramics", *J. Alloys and Compounds*, 509: 8421(**2011**)	2.726	63
12	Dinesh Varshney, Kavita Verma, **Ashwini Kumar,** " Substitutional effect on structural, magnetic properties of $A_xCo_{1-x}Fe_2O_4$ (*A*=Zn, Mg; *x*=0.0, 0.5) ferrites", *J. Molecular Structure*, 1006: 447 (**2011**)	1.599	36
13	Dinesh Varshney, Kavita Verma, **Ashwini Kumar**, "Structural and vibrational properties of $Zn_xMn_{1-x}Fe_2O_4$ (= $0.0 \leq x \leq 1.0$) mixed ferrites", *Materials Chemistry and Physics*, 131: 413 (**2011**)	2.129	35

Conference/Symposium Publications

14	X-Ray diffraction and Raman scattering study of Cr-doped $ZnFe_2O_4$ spinel ferrites	**Ashwini Kumar**, Poorva Sharma and Dinesh Varshney	***AIP Conf. Proc.*** **1665**, 090027 (2015)
15	Synthesis, structural and vibrational properties of $Bi_{0.8}La_{0.15}A_{0.05}FeO_3$ (*A* = Ca, Sr)	Poorva Sharma, **Ashwini Kumar** and Dinesh Varshney	***AIP Conf. Proc.*** **1665**, 140009 (2015)
16	Effect of Zn doping on structural & dielectric properties of tetragonal $Ni_{1-x}Zn_xFe_2O_4$ ($0.0 \leq x \leq 0.5$)	S. A. Lone, M. A. Dar, **A. Kumar**. Poorva Sharma and Dinesh Varshney	***AIP Conf. Proc.*** **1665,** 110016 (2015)
17	Structural and magnetic properties of Ni-doped SnO_2	Sonam Dwivedi, **Ashwini Kumar**, M. A. Dar, D. Varshney	***AIP Conf. Proc.*** **1665,** 050081 (2015)
18	Structural and dielectric properties of Nd/Ca Co-doped Bi-ferrite multiferroics	**Ashwini Kumar**, Poorva Sharma, and Dinesh Varshney	***AIP Conf. Proc.*** **1591**, 40 (2014)
19	Structural and Raman scattering study of Ni-doped $CoFe_2O_4$	**Ashwini Kumar**, M. A. Dar, Poorva Sharma and Dinesh Varshney	***AIP Conf. Proc.*** **1591**, 1148 (2014)
20	Phonon and Magnon scattering of $Bi_2Fe_4O_9$ ceramic	Poorva Sharma, **Ashwini Kumar** and Dinesh Varshney	***AIP Conf. Proc.*** **1591**, 1068 (2014)
21	Influence of *A*-site doping on structural properties of $Bi_{0.95}Pr_{0.05}FeO_3$ multiferroic	Dinesh Varshney, Poorva Sharma, **Ashwini Kumar**	***AIP Conf. Proc.*** **1447**, 815 (2012)
22	Effect of Mg doping on dielectric properties of $CuFe_2O_4$ nanoparticles	Kavita Verma, **Ashwini Kumar**, Dinesh Varshney	***AIP Conf. Proc.*** **1447**, 255 (2012)
23	Structural and phonon modes of multiferroic $Bi_{0.9}Ca_{0.1}Fe_{0.9}Co_{0.1}O_3$ nanoparticles	Dinesh Varshney, Geeta Das, **Ashwini Kumar**	***AIP Conf. Proc.*** **1349,** 251 (2011) *Cited by* 1

AWARDS/ RECOGNITION OF EXCELLENCE IN RESEARCH

- † Total research citations: ≥ **275**
- Total Impact factor: **22.03**
- Highest citation of individual paper (*J. Alloys and Compounds* **2011**, 509, 8421): **63**

- Elsevier recognized **'Top 25 Hottest articles'** in the field of Materials Science**:**, *Ceramics International,* Vol. 38, pp. 3935 (2012) during April – June 2012.
- Elsevier recognized **'Top 25 Hottest articles'** in the field of Materials Science**:**, *J. Alloys and Compounds*, Vol. 509, pp. 8421 (2011) during period July – September 2011

- **Workshops/ Conferences attended:**

1. 29th M. P. Young Scientist Congress (MPCST), Feb. 2014, Bhopal (M. P.)
2. 58th DAE - Solid State Physics Symposium, Dec. 17-21 (2013), Thapar University, Patiala, Punjab.
3. International Conference on Structural and Physical Properties of Solids, Nov. 2013, Indian School of Mines (ISM), Dhanbad, (Jharkhand)
4. Theme meeting on "Physics of Phase Transition-2013" Sept. 2013, UGC-DAE CSR, Indore (MP)
5. Workshop on Recent Developments in Magnetic Materials and Thin Films (RDMMTE) – May 2013, UGC - DAE CSR, Indore (M. P.)
6. 17th National Seminar on Ferroelectrics and Dielectrics (NSFD – 2012), 17-19 December 2012, S'O'A University, Bhubaneswar, Orissa.
7. 27th M. P. Young Scientist Congress (MPCST), February 2012, Bhopal (M. P.)
8. International Conference on Recent Trends in Physics 'ICRTP 2012' February 2012, School Of Physics, Devi Ahilya University, Indore, (M. P.)
9. 56th DAE - Solid State Physics Symposium, Dec. 2011, SRM University, Chennai, Tamilnadu.
10. 55th DAE - Solid State Physics Symposium, Dec. 2010, Manipal University Manipal, Karnataka.

PROJECTS UNDERTAKEN

- M. Sc. Project (six months) entitled "**Synthesis and characterization of doped $YBaCu_3O_{7-\delta}$ Superconductors**" under the supervision of Prof. Dinesh Varshney from School of Physics, Devi Ahilya University, Indore (M.P.)
- M. Phil. Project (six months) entitled "**Structural and dielectric study of Sr-doped $BiFeO_3$ multiferroics**" under the supervision of Prof. Dinesh Varshney from School of Physics, Devi Ahilya University, Indore (M.P.)

Declaration: I hereby declare that the particulars furnished above are true and correct to the best of my knowledge and belief.

Place: Nanjing, China **(Ashwini Kumar)**