



1. Name (in block letters): DR. MRS. V. SORNA GOWRI

2. Postal Address for: Advanced Materials and Processes Research Institute
(AMPRI)

Correspondence

Hoshangabad Road, Habibganj Naka

Bhopal – 462 026, India

Tel. No: 091 -755- 587609, 587615 (O) 423390 (R)

Fax. No : 0755 –587042, 580985

E-mail : gowrisorna@yahoo.com

3. Permanent Address :

T-1, Kanak Retreat , E-7, 16-A,

Ashoka Society, Arera colony,

Bhopal - 462 016 ,

Madhya Pradesh, India

Ph. No. 091-755-2423390

4. Date of Birth : 11.06.1965

5. Academic Record:

S.No	Degree/	Period of Study	University / Institution	Subjects	Percentage
1.	Xth	1979 - 1980	St. Annes School, T. N	general	77
2.	H.Sc	1980-1982	St. Annes School, T. N	Maths, phy, Chem, Bio	77
3.	B.Sc	1982-1985	Madras University	Chemistry, physics, mathematics	73.4
4.	M.Sc	1985-1987	Anna University, Chennai	Applied chemistry	66.9
5.	M.Phil	1988-1989	Presidency College, Madras Univ. Chennai.	Inorganic chemistry	67.3
6.	Ph.D	2001	-	Applied chemistry	---
7.	Post Doctoral Fellow	2003 -04	Institute Curie, Paris, France	Polymer synthesis and characterization for micro fluidic separations	-
8.	Post Doctoral Fellow	2008-2009	University of Minho, Portugal	Synthesis and characterization of nanoparticles and nanocomposites	-

DETAILS OF POST GRADUATE WORK :

M.Sc (Applied Chemistry)

Project work was on Polymer Chemistry; entitled **Graft copolymerization of Natural rubber with methylmethacrylate.**

M.Phil(Chemistry)

Thesis work was on **Inorganic Chemistry** entitled **Effect of Alpha-Alpha Bipyridyl on Chromium (VI) induced electron transfer reaction**

other subjects studied are

1. Instrumental Methods Of Analysis

2. Research Methodology

Ph.D(Applied Chemistry)

Development and characterization of polymer coatings and composites

Jan '94 -Jan '96 :

Worked as *Project Assistant in Regional Research Laboratory (CSIR); Bhopal*; in a project sponsored by National Building Organization; Nirman Bhavan; New Delhi. The project was related to development and characterization of Polymer Composites from agro waste.

Nature of Work:

- Characterization of Ipomoea (a forest waste) for physico-chemical and thermal properties by IR analysis; Thermogravimetric analysis and Differential Thermal Analysis; for use as reinforcement in polymer matrix.
- Characterization of Polymer for physical; chemical and mechanical film properties.
- Preparation of polymer composites from Ipomoea using thermosetting resins.
- Characterization of composites for physical and mechanical properties.

April96 – Dec1998:

CSIR Senior Research Fellow in Regional Research Laboratory (CSIR); Bhopal on fellowship awarded by CSIR; New Delhi. The project centered on the utilization of agro/industrial wastes and development of value added products from bamboo in the form of polymer composites and coatings.

Nature of Work:

The study includes the development of coating materials from agro/industrial waste materials; Characterization of newly developed coating materials. The details of the studies conducted are mentioned below:

- Formulation and preparation of protective coatings for the protection of bamboo surfaces from severe corrosive environments during structural applications.
- Characterization of coatings for the following properties:
- Properties: Viscosity; Specific gravity; Volatile Organic Content; Coverage and Percentage Solids.
- Film characteristics: Thickness; Brushability; Drying time; Gloss; Scratch hardness; Impact resistance and Flexibility.
- Abrasion resistance
- Corrosion resistance and weathering properties
- Characterization of polymer composites

January 1999 to till date

Working as Technical Officer in RRL(CSIR); Bhopal

After joining as Technical Officer; nature of work involves the development and characterization of building materials. Recently engaged in the following projects.

- Development/ Training of value added products from Natural Fibers of M.P.
- Development of Red mud (NALCO) fiber reinforced polymer composite for building components as wood substitute.
- Development of paints for building applications using Industrial wastes.
- Development of polymer composites using agro/industrial waste
- Development of MEMS and sensors
- Development of New detection systems and matrices for micro fluidic separations
- Development of fuel cell based on hydrogen

Skills :

1. Testing and characterization of polymer composites.
2. Chemical analysis of polymer composites
3. Instrumental analysis on following equipments:

- Atomic Absorption Spectrophotometer (AAS) for elemental analysis.
- X-ray Diffractometer for Phase analysis.
- Scanning Electron Microscope (SEM) for Microstructural study.
- Simultaneous Thermal Analyzer (STA) for Thermo-Gravimetric Analysis (TGA) and Differential Thermal Analysis (DTA) of materials.
- Infrared spectrophotometer for qualitative identification of compounds.
- Chromatographic Separation techniques like Gas Chromatography; Column Chromatography; High Performance Liquid Chromatography (HPLC); Gel permeation Chromatography and
- Capillary Electrophoresis.

3. Characterization of polymer composites using equipment mentioned below (BY national and international standards):

- Mechanical strength testing by UTM
- Determination of physical properties like density ; specific gravity; Moisture content etc.;
- Determination chemical properties; through XRD analysis; FTIR; IR; etc.;
- Determination weathering properties using weather-o-meter. Salt spray; corrosion resistance etc.
- Surface study of polymers like contact angle; surface free energy and surface tension of liquid polymers.
- Molecular weight determination by GPC
- Viscosity by Brookfield viscometer
- Particle size analysis of nanoparticles

Postdoctoral Study at Instt Curie, Paris (Sep2003 – Sep 2004):

The post doctoral study at Instt Curie; Paris involved the preparation and characterization of new polymers of the type polymer blocks keeping in view of the surface treatment and control of electro osmosis in the applications of bio molecules separation in electrophoresis and in Lab – on –chip . The lab on chip includes diversified materials (thermoplastics; elastomers; glass; silicon) and it is very important to control the interaction of the bio molecules with these surfaces; to avoid the unwanted adsorption on

the capillary surfaces. The copolymers developed presented strong affinity for the surface and controlled the spatial separation between different functions in a very large range rather than that of traditional surfactants. A series of copolymers such as; Hydrophobically modified polyacrylates; PDMA grafted PMMA and P(AM –PDMA) were synthesized characterized and used for the separation of bio molecules by micro fluidic separation

Post doctoral study at University of Minho, Portugal (Dec 2008 – Dec 2009)

Polymer nanocomposites offer possibility of developing a new class of nanofinishing materials for textiles with their own manifold of structure property relationship. Approaches to modify the polymer nanocomposites by various inorganic substances can lead to a huge number of additional functionalities. In this research work zinc oxide nanoparticles were prepared by wet chemical method and ZnO-PMMA nanocomposites were prepared by dispersing the ZnO nanoparticles in solution of PMMA and applied on polyamide fabrics by padding. The aims are to impart superhydrophobicity and UV protection function to the polyamide textile surface and the functional properties of coated fabrics were studied. The nanofinished polyamide fabrics showed superhydrophobicity. The results also showed that the impregnation of fabrics with ZnO-PMMA nanofinishings also enhanced the protection of polyamide fabrics against UV radiation.

High performance polymers exhibiting multifunctional characteristics can be achieved by the introduction of inorganic nanoparticles like SiO₂ in to the functional polymers. The nanoparticles have high surface energy due to large surface area and it is difficult to disperse them in any organic solvent and functional polymers, which is very essential for many applications of these nanoparticles as nanofinishings. Therefore it is necessary to use surface modifiers, dispersant to enhance the dispersion of nanoparticles before adding them to any solvent or functional polymers in making nanofinishings to prevent the formation of agglomerated nanoparticles. In this work a copolymer epoxy poly(dimethylacrylamide) was synthesized to disperse the SiO₂ nanoparticles. FT-IR studies of the polymer adsorbed SiO₂ nanoparticles confirmed that the polymer molecules chain was anchored on the surface of the SiO₂ nanoparticles. The improved interfacial interaction between the particles and polymer enhanced the thermal properties of the

composites. The results also show the newly synthesized polymer disperse the nanoparticles well as evidenced by SEM analysis, the uniformly dispersed SiO₂ nanoparticles in the polymer matrix and the particles almost remained in their original shape and size even after incorporation in to the polymer matrix.

Project Leadership:

Project leader of Indo_Portugese collaborative project titled '**Development and optimization of processes for permanent hydrophilic and hydrophobic surface coatings with nano particles for multifunctional finishing of textiles**'

Specific objectives are:

- To obtain hydrophobic polymer able to behave as a matrix for the dispersion of nanoparticles with high ability to bind natural and synthetic textile materials, providing them with highly durable water repellency associated with other functionalities directly coming from nanoparticles performance
- To obtain hydrophilic co-polymer able to behave as a matrix for the dispersion of nanoparticles with high ability to bind to textile materials, providing them with the capacity to moisture regulation associated to other functionalities directly coming from nanoparticles performance.
- To modify textile substrates by chemical or physical methods to promote irreversible binding of the nanocomposite formed by the polymer and dispersed nanoparticle.
- To achieve permanent functional properties for the textile materials(natural and synthetic) by selecting the adequate system of nanoparticles dispersed in polymer matrix and to control characteristics of final products according to international norms.

Awards/Honours/Recognition

1. Awarded *CSIR Senior Research Fellowship* by CSIR; New Delhi.
2. Received **ISCA Young Scientist Award** in 85th Indian Science Congress held in Osmania University; Hyderabad during 3-7th Jan; 1998 in **Material Science Section**.
3. Member of discovery group of medicinal plant project of CSIR; New Delhi, India for the development of anti cancer medicine
4. **Post doc fellowship** by Instt. Curie; Paris; France form Sep 2003 – Sep 2004

5. Received best Poster presentation award for the paper on **Lab-on-a Chip devices for environmental Analysis** A.Tiwari; V.Baderia; S.Lamba; A.Pandit; P.Nigam; S.Gupta; V.S.Gowri and S.K.Sanghi; presented in **National Conference on Environment and its effects on urban Areas** on Nov.26; 2006
6. **Post doc fellowship** , University of Minho, Portugal from Dec 2008 – Dec 2009
7. Received best paper award for the paper on Determination of aliphatic amines by gas chromatography after in-syringe derivatization with pentafluorobenzoyl chloride, by AMPRI, Bhopal, 2013
8. Asst Professor, Academy of Science and Innovative Research in the faculty of Engineering Sciences from Dec 2013.

Deputation abroad

1. Visited University of Minho Portugal during 29th Nov to 10th Dec 2011 under Indo Portuguese collaborative project
2. Visited University of Minho Portugal during 20th Dec to 31st Dec 2012 under indo Portuguese collaborative project.
3. Visited University of Minho Portugal during 10th Dec to 19th Dec 2013 under Indo Portuguese collaborative project

Membership

Life member of Materials Research Society of India

Ph.D Supervised

- Vishal K. Baderia, Analysis of biomolecules and toxicants using miniaturized separation technique, Ph.D awarded in 2012.
- Ankita Tiwari, Fluorescence Detection in Miniaturized separation system and their application in clinical and environmental analysis, submitted in September 2011.
- Two students from Amity University have completed their dissertation for their masters degree

List of Publications

Patents	
1.	A process for the preparation of improved surface coatings from Bhilawanut shell Liquid useful for the protection of bamboo Surfaces; No : 2382/DEL/98
2	A process for the preparation of styrene based coatings from Bhilawanut Shell Liquid for the protection of bamboo surfaces. No: 2708/DEL/98

Publications in International / national Journals

1.	V. Sorna Gowri, Luís Almeida, Teresa Amorim, Noémia Carneiro, António Pedro Souto, Maria Fátima Esteves, Novel Copolymer for SiO ₂ Nanoparticles Dispersion, Journal of Applied Polymer Science, Vol. 124, 1553–1561 (2012)
2.	Vishal Kumar Baderia, V.Sorna Gowri, Sunil Kumar Sanghi, Ankita Shukla, Deepesh Kumar Singh Stable physically adsorbed coating of poly vinyl alcohol for the separation of basic proteins, , J. Anal. Chemistry, 67 (3), 278-283, 2012.
3.	Ankita Shukla, Sunil Kumar Sanghi, V. Sorna Gowri, Vishal Kumar Baderia, Sushma Lamba and Deepesh Kumar Singh, Determination of biological amines in lake water by micellar electrokinetic chromatography with fluorescence detection after derivatization with fluorescamine., J. Analytical Chemistry, 66,3, 296–300, 2011
4.	Deepesh Kumar Singh, Sunil Kumar Sanghi, V. Sorna Gowri, and Navin Chandra , Determination of aliphatic amines by gas chromatography after in-syringe derivatization with pentafluorobenzoyl chloride, Journal of Chromatography A, 1218, 5683– 5687, 2011. (Impact Factor 4.194)
5.	Polymer nanocomposites for multifunctional finishing of textiles – a review Sorna Gowri ¹ , Luís Almeida, Teresa Amorim, Noémia Carneiro, António Pedro Souto, Maria Fátima Esteves, Textile Research Journal, Vol.18 (13), 1290-1306, 2010.
6.	Functional finishing of polyamide fabrics using zno-pmma nanocomposites Sorna Gowri ¹ , Luís Almeida, Maria Teresa Pessoa de Amorim, Noémia Carneiro Pacheco, António Pedro Souto, Maria Fátima Esteves, Sunil Kumar Sanghi ² , Journal of Materials Science, 45, 2427-2435, 2010.
7.	"Determination of aliphatic amines by high-performance liquid chromatography-amperometric detection after derivatization with naphthalene-2,3-dicarboxaldehyde" by Sushma Lamba; Arti Pandit; V S Gowri; Ankita Tiwari; Vishal K Baderia; Deepesh K Singh; Preeti Nigam, Analytica Chimica Acta, , 614 , 190-195, (2008)
8.	Vers une puce microfluidique pour la détection demutations inconnues et le genotypage Weber J; Fütterer C; Gowri S; Attia R; Viovy JL : « Vers une puce microfluidique pour la détection de mutations inconnues et le génotypage »; La Houille Blanche; . journal de la SociétéHydrodynamique de France 2006; 5 :40-44.

9.	
9.	Mohini Saxena & V. Sorna Gowri; Studies on Bamboo Polymer Composites with Polyester Amide Polyols as Interfacial Agent International Journal of Polymer Composites; June 2003; Vol 24; No.3.; pp428-436
10	Mohini Saxena, V. Sorna Gowri, J. Prabhakar and Sangeeta T. Innovative Building Materials; Polymer Composites, Copper Tailing Bricks, Blue Dust Primers Civil Engineering & Construction Review (CE & CR) Vol.15, FEB 2002, p4
11	V.Sorna Gowri & Mohini saxena; BNSL based coatings for bamboo Protection; Journal of Applied Polymer Science; Vol. 69; 487- 493; 1998.
12	V. Sorna Gowri & Mohini Saxena; Protection of bamboo surfaces by CNSL based coatings ; Indian Journal of Chemical Technology; Vol.4;145-149;1997.
13	V.Sorna Gowri; Development of coating from agro waste materials Paint India; Nov. 2000;pp35 – 44.
14	Mohini Saxena & V.Sorna Gowri; Agro and Industrial Wastes for building Materials ; Science Tech. Entrepreneur; Vol.9; No.3; March 2001; pp61 –64
15	Mohini Saxena & V. Sorna Gowri; Industrial wastes polymer composites (IWPC) – a versatile material for wood substitute ; Everyman’s Science; Vol XXXVI NO.2; July – September; 2001
16	V.Sorna Gowri & Mohini Saxena; Protective Coatings from Bhilawanut Shell Liquid(BNSL); Science Tech. Entrepreneur; Vol.11; No.3; March 2003; pp57 –60
17	V.Sorna Gowri & Mohini Saxena; Bamboo composites for sustainable rural development J. Rural Tech. Vol.1.; No.1.; Sep2003; pp6-10
18	V.Sorna Gowri & Mohini Saxena; Protective coatings from agrowastes J. Rural Tech. Vol.4.; No.1.; July 2004; pp151 – 155.
19	V. Sorna Gowri and Mohini Saxena; Bamboo composites - for sustainable rural development J. of Rural Tech. Vol. 1 No. 1 Sept. 2003; Pp6-10.

Publications in Proceedings

1	V. Sorna Gowri , Luís Almeida, Teresa Amorim, Noémia Carneiro ,Pedro Souto, Fátima Esteves, SiO ₂ Nanoparticles Dispersion in epoxy poly(dimethylacrylamide), Proceedings International conference on Nanomaterials and nanotechnology, 13- 16 Dec, 2010, Tamilnadu, India.
2	Durability of functionalities in polyamide 6.6 fabrics by zno-pmma nanocomposites N. Carneiro*, A. P. Souto*, S. Gowri**, S. Ventura* in conference AUTEX 2010,Proceedings of World Textile Conference,21 – 23 June 2010 in Vilnius, Lithuania.
3	S.K.Sanghi, V.S.Gowri, G.K.Gupta, S.Lamba, V.Baderia, A.Tiwari, G.S.Virdi, R.Chutani, R.C Choudry and V.Yagnaraman. Integrated Microfluidics devices for chemical ad biological analysis , Proceedings of ISS- MEMS 2007, 16 -17, 2007
4	S.K.Sanghi; Sorna Gowri and Jean Louis VIOVY; Nanofilm capillary coating for DNA separation published in proceedings of International Conference on Emerging Mechanical Technology: Macro to Nano; EMTM2N – 2007; 16 – 18 Feb.; 2007
5	Rafaele Attia; Sorna Gowri; Clus Fuetterer; Sunil Kumar Sanghi; Jean –Louis Viovy; –Towards a micro fluid chip for mutation detection and genotyping presented at Micro fluidics 2004; Toulouse; Dec 2004.
6	V.Sorna Gowri; Development of protective coatings for bamboo from agro based waste materials Proc. 85 th Indian Science Congress; Org. Indian Science Congress Association; Hyderabad; 3-7 th January; pp42–43; 1998.
7	V.Sorna Gowri; Protection of bamboo surfaces by CNSL based coatings ; Proc. M.P.Young Science Congress; Org. Guru Ghasidas University; Bhilaspur; M.P; Feb.28 – Mar 2; P 41; 1997.
8	V.Sorna Gowri & Mohini Saxena; Protective coatings for bamboo from Agro wastes Proc. National Conference on Industrial Wastes in Development of Building Materials; Org. BMTPC; New Delhi & RRL; Bhopal; 30 th April; pp 58 – 77; 1998.

9	V.Sorna Gowri & Mohini Saxena; Enhancement of durability of bamboo by flyash based coatings Proc. National Workshop on Flyash Utilization Org. Central Board of Irrigation and Power; New Delhi; 11-12 January; p117; 1995.
10	V.Sorna Gowri & Mohini Saxena; New Surface coatings developed using plant based waste materials for bamboo protection; Proc.10 th Annual General Meeting of MRSI; Org. RRL; Bhopal & MRSI Bhopal Chapter; B-22; P 13; 8 10 Feb. 1999
11.	V.Sorna Gowri & Mohini Saxena; Studies on bamboo polymer composites with polyesteramide polyols as interfacial agent; Proc. International Conference on Waste and Byproducts as Secondary Sources for Building Materials (Built India'99) pp157–170; 1999.
12.	Mohini Saxena & V.Sorna Gowri; Potentials of utilization of industrial wastes for developing wood substitute; Proc. International Conference on Waste and Byproducts as Secondary sources for Building Materials (Built India'99); pp404 – 422; 1999
13.	V.Sorna Gowri & Mohini Saxena; Flyash – a filler in bamboo protective coatings; Proc. International Symposium on Management and Use of Coal ash Combustion Products; org. American Coal Ash Association; Inc.; Florida; USA; Vol. 1; pp8-1 to 8-16; 1999.
14.	Mohini Saxena; P.Asokan; J.Prabhakar and V.Sorna Gowri; Effective utilization of coal ash and barriers for its usage. workshop on flyash utilisation: issues and strategies; The institution of engineers (India); M.P State center; Bhopal; pp31 -37; Sep 2000.
15.	J.Prabakar; M. Saxena and V. Sorna Gowri; Utilisation of Fly ash in Development of Building materials and its Application at RRL Bhopal; Souvenir; seminar on Fly – Ash Organized by; NTPC; Simhadri; Thermal Power Project; Visakhapatnam; 19 – 20 December; 2000.
16.	V.Sorna Gowri; Mohini Saxena; Arti Roy; Swati Lahari; R.Dasgupta Contributions of women scientists and technologists of RRL; Bhopal in rural upliftment Conference on Women scientists and Technologists; organized by DBT & DWCD; New Delhi ; 8-9 March; 2002.

