

Dr. Vaishali Singh - Professor,

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Education:

M.Sc. in Chemistry with specialisation in **Physical Chemistry** in the year 1992, from **University of Delhi**.

Awarded **Ph.D.** in the field of **Chemical Kinetics** involving the study of, "Kinetics of reactions between substituted phenols and carbonyl compounds" from **University of Delhi** in the year 1998. During this tenure, kinetics of fast reactions - "Complexation reactions between metal ions and amino acids" that have a half life of few milliseconds, was also studied by using the stopped flow technique.

Work experience:

Have taught in various Delhi University colleges- Maitreyi college, Sri Venketeswara College and Kirori Mal College on ad-hoc basis during the years 1997-1998. From October 1998- July 2001, worked as Departmental Research Associate in the Department of Chemistry where, besides carrying out the Research work, was involved with teaching of M.Sc. and M.Phil. courses for nearly three years. Appointed as Lecturer in Chemistry in School of Basic and Applied Sciences at GGS Indraprastha University in July 2001; and as Reader in the USBAS in the year 2008, presently working as an Associate Professor. Has over 20 years of postgraduate and undergraduate teaching experience.

Research Area:

After initially working in the area of Chemical Kinetics, started working in the field of Nanosciences and set up the first Nanoscience Research lab at the old Kashmere Gate campus of GGSIPU in the year 2005 and initiated a small research group. One of the studies was directed on "the soft route synthesis and characterisation of calcium phosphate nanostructures under varying experimental conditions". An interesting aspect of this study was to find the correlation between the nanostructures formed and the surfactant self-assembly. Two research papers have been published from this work in International Journals.

The second investigation was carried out on "the study of ferrite nanoparticles and their tunable magnetic properties". Magnetic behavior of these nanomaterials has interestingly shown very strong dependence on the process methodology and the size of the nanoparticles formed. These findings have been published in six research papers in international journals so far.

Currently working on the synthesis of mesoporous silica nanoparticles for their use in potential applications, particularly as humidity sensors and gas sensors and swift heavy ion beam induced modification in polymer nanocomposites system. Future area of research interest lies in study of

nanomaterials that find applications in the field of **sensors, surface modification and magnetic resonance imaging**.

Achievements:

- Recipient of **National scholarship** in 1990, for holding a University Merit Position during graduation
- Qualified **GATE** examination with 96.7 percentile score
- Qualified the **CSIR** examination for Lecturership
- Adjudged the **Best Teacher** at GGSIPU in the year 2003
- Was a part of the core team from USBAS in getting the grant of more than Rs. 3.17 Crores from the DST to start M. Tech program in Nanoscience & Technology at GGSIPU
- Program Coordinator for M. Tech program in Nanoscience & Technology from 2008-2011

Research Publications:

1. M. Dutt, K. Suhasini, A. Ratan, J. Shah, R.K. Kotnala, **V. Singh**, Mesoporous silica mediated synthesis of α -Fe₂O₃ porous structures and their application as humidity sensors, *J. Mater. Sci. Mater. Electron.* 29 ,**2018**, 20506–20516.
2. M. Kaur, A. Ratan, S. Kunchakara, M. Dutt, **V. Singh**, Cr doped MCM-41 nanocomposites: an efficient mesoporous catalyst facilitating conversion of toluene to benzaldehyde, an industrial precursor, *J. Porous Mater.* ,**2018** . doi: 10.1007/s10934-018-0642-z
3. S. Kunchakara, M. Dutt, A. Ratan, J. Shah, **V. Singh**, R.K. Kotnala, Synthesis and characterizations of highly ordered KCl–MCM–41 porous nanocomposites for impedimetric humidity sensing, *J. Porous Mater.* ,**2018**, . doi:10.1007/s10934-018-0613-4.
4. S. Kunchakara, J. Shah, **V. Singh**, R.K. Kotnala, Wide range humidity sensing of LiCl incorporated in mesoporous silica circular discs, *Phase Transitions.* 90 (2017) 1241–1255.
5. S. Kumar, P. Kumar, **V. Singh**, U. Kumar Mandal, R. Kumar Kotnala, Synthesis, characterization and magnetic properties of monodisperse Ni, Zn-ferrite nanocrystals, *J. Magn. Mater.* 379 ,**2015**, 50–57
6. Sanjeev Kumar, **Singh, Vaishali**, Mandal, U. K. and Kotnala, R.K. Nanocrystalline Co_{0.5}Zn_{0.5}Fe₂O₄ ferrite: Synthesis, characterization and study of their magnetic behavior at different temperatures. *Inorganica Chimica Acta*, **2015**, 428, 21-26. **Impact factor: 2.041, ISSN. 0073-8085.**
7. Kumar, Sanjeev, **Singh Vaishali**, Aggarwal, Saroj, Mandal, U. K. and Kotnala, R.K. “Monodisperse Co, Zn-Ferrite nanocrystals: Controlled synthesis, characterization and magnetic properties” *Journal of Magnetism and Magnetic Materials* **2012**, 324, 3683-3689 **Impact factor 1.892 , ISSN: 0304-8853**

8. Kumar, Sanjeev, **Singh Vaishali**, Aggarwal, Saroj, Mandal, U. K. and Kotnala, R.K. "Synthesis of nanocrystalline $\text{Ni}_{0.5}\text{Zn}_{0.5}\text{Fe}_2\text{O}_4$ ferrite and study of their magnetic behavior at different temperatures" *Materials Science and Engineering B*, **2010**, 166, 76-82. **Impact Factor: 1.862, ISSN: 0921-5107**
9. Kumar, Sanjeev, **Singh Vaishali**, Aggarwal, Saroj, Mandal, U.K. and Kotnala, R.K. "Influence of processing methodology on magnetic behavior of multicomponent ferrite nanocrystals" *Journal of Physical Chemistry C*, **2010**, 114, 14, 6272 – 6280. **Impact Factor : 4.835, ISSN : 1932-7447**
10. Kumar, Sanjeev, **Singh Vaishali**, Aggarwal, Saroj, Mandal, U.K. and Kotnala, R.K. "Bimodal $\text{Co}_{0.5}\text{Zn}_{0.5}\text{Fe}_2\text{O}_4$ /PANI nanocomposites: Synthesis, formation mechanism and magnetic properties" *Composites Science and Technology*, **2010**, 70, 2, 249 – 254. **Impact Factor: 4.480, ISSN: 0266-3538**
11. Bhardwaj, Pallavi, **Singh Vaishali**, Mandal, U.K. and Aggarwal, Saroj. "Polyacrylamide and poly(acrylamide-co-2-acrylamido-2-methyl-1-propanesulfonic acid)-silica composite nanogels through in-situ microemulsion polymerization" *Journal of Materials Science*, **2010**, 45, 1008-1016. **Impact Factor: 2.305, ISSN: 0022-2461 (print version), ISSN: 1573-4803 (electronic version)**
12. Singh, Sujata, **Singh Vaishali**, Aggarwal, Saroj and Mandal, U. K "Synthesis of brushite nanoparticles at different temperatures" *Chemical Papers*, **2010**, 64, 491-498. **Impact Factor; 1.193. ISSN: 0366-6352 (print version), ISSN: 1336-9075 (electronic version)**
13. Bhardwaj, Pallavi, **Singh Vaishali**, Aggarwal Saroj and Mandal, U. K. "Poly(acrylamide-co-2-acrylamido-2-methyl-1-propanesulfonic acid) nanogels made by inverse microemulsion polymerization" *Journal of Macromolecular Science Part A: Pure and Applied Chemistry*, **2009**, 46 (11), 1083-1094 ; Taylor & Francis. **Impact factor 0.85. ISSN: 1060-1325 (print), 1520-5738 (Online)**
14. Kumar, Sanjeev, Singh, Vaishali, Aggarwal, Saroj and Mandal, U. K. "Synthesis of 1-dimensional polyaniline nanofibers by reverse microemulsion" *Colloid Polym Sci*, **2009**, 287, 9, 1107-1110. **Impact Factor: 2.410. ISSN: 0303-402X (Print) 1435-1536 (Online),**
15. Kumar Sanjeev, Singh Vaishali, Aggarwal Saroj and Mandal, U. K. "Synthesis of polyaniline nanostructures via reverse micromulsion technique" *Soft Materials*, **2009**, 7, 150–163, **Impact Factor:1.74, 1539-445X (Print), 1539-4468(Online)**
16. Bhardwaj Pallavi, Singh Sujata, **Singh Vaishali**, Aggarwal Saroj and Mandal U.K. "Synthesis of Nanocrystalline Calcium Phosphate in Microemulsion – Effect of Nature of Surfactants" *Journal of Colloid and Interface Science*, **2008**, 319, 322-329. **Impact Factor: 3.583, 0021-**

9797(Print); 1095-7103(Electronic)

17. Singh Sujata, Bhardwaj Pallavi, Singh Vaishali, Aggarwal Saroj and Mandal U.K. "Nanosize polycrylamide/SiO₂ composites in inverse microemulsion polymerisation" *International Journal of Polymeric Materials*, **2008**, S7:4, 404-416.
18. Malhotra, H.C., Singh Vaishali and Ratan Shalu "A Kinetic Study of reaction of 2-secbutyl phenol with formaldehyde using different alkali catalysts" *Journal of Indian Chem.Soc.* Vol.78, February **2001**, .82-85.
19. Malhotra H.C. Chopra, Haritma and Singh, Vaishali. "Complexation of nickel, cobalt and copper (II) with L-3,4 dihydroxyphenylalanine – Kinetic Studies" *Journal of Indian Chem Soc.* Vol.77, May **2000**, pp.228-231.
20. Malhotra, H.C. Ratan, Shalu and Singh Vaishali. "Kinetics of Complexation of Ni(II) and Co(II) with L-2, 6 diaminocaproic acid" *Indian Journal of Chemistry*, Vol.38A, February **1999**, pp.136-140.
21. Malhotra H.C. and Singh Vaishali. "A Kinetic study of acid catalysed reaction of 4-ethylphenol and acetone" *Indian Journal of Chemistry*, Vol.37B, June **1998**, pp.549-552.