

**Prof. U.S. Rai**



1. Name: (first name) UMA (middle name) SHANKER (surname) RAI
2. Designation: Professor, Retired
3. Academic Qualifications:

S.N.	Degree	Institution	Year
1	B.Sc.	Banaras Hindu University	1970
2	M.Sc.	Banaras Hindu University	1972
3	Ph.D.	Banaras Hindu University	1976

4. **Area of Specialization:** (brief write up, 200 words) PHYSICAL CHEMISTRY

He is specialized in physical chemistry and has experience of working in solid state chemistry, in general, and chemistry of hydroxylapatites, chemistry of organic eutectic, Monotectics and molecular complexes, ESR of radical anions and cations, polymer matrix composites, nano-materials and calcium copper titanate, in particular.

**Hydroxylapatites:** He has developed dry and wet techniques for the synthesis of hydroxylapatites and its various isomorphs obtained as a result of cationic and anionic substitutions. Their solubilities were studied under simulated biological conditions.

**Eutectics and Monotectics:** He has studied phase diagram, linear growth velocity, microstructure, thermo-chemistry, spectral, electrochemical and optical behaviour of different organic analogs of metal-metal, metal-nonmetal and nonmetal-nonmetal systems.

**ESR:** He has studied molecular structure of different radical cations and radical anions using ESR at liquid nitrogen temperature.

**Polymer matrix composites:** He has prepared and studied the mechanical properties of different polymer matrix composites involving polymers in cement and white cements in polymers.

**Nano-materials:** He has synthesized gold and silver nano-particles by seed mediated chemical method and characterized them by TEM and spectral methods. These nano-particles were used for detections of Hg ion at ppt levels in different source of water and they were also used in detection of HIV, Anthrax and E-coli in biological systems.

**Calcium copper titanate:** To get high dielectric constant and low dielectric loss capacitor materials, different chemical synthetic routes were developed for the synthesis of Calcium copper titanate electro-ceramics. They were characterized by TGA/DTA, XRD, SEM, TEM, EDX and dielectric measurements.

5. Contact Information: 0542- 2570 590<sup>®</sup>, 9451939232 (Mob.), usrai\_bhu@yahoo.co.in
6. Projects Undertaken as PI/ Co PI: 8
7. **Awards/ Recognitions if any:**

1. Attended Gordon Research Conference on Crystal Growth in Ply Mouth, NH, USA during July 15-19, 1985.
2. Worked as Research Associate in Leicester University, U.K. from September 1991 to September 1993.
3. Attended ASM 2003 Materials Solution Conference in Pittsburgh, USA, during October 13-15, 2003.
4. Worked as Research Scientist in Jackson State University, Jackson, USA, during May 2007 to May 2008.
5. Attended the Conference on Laser Induced Breakdown Spectroscopy-2011 in Clear Water Beach, Florida, USA during July 18-20, 2011. and 11th Computational Chemistry and Materials Science conference in Jackson State University, Jackson, USA, July 28-29, 2011.
6. Gave Invited Talk in the Conference on Computational Chemistry and Materials Science held at Jackson State University, Jackson, Mississippi, U.S.A. during July 23-24, 2015.

**8. List of 10 major Publications: (in order of importance):**

1. Chemistry of eutectic and monotectic; phenanthrene-succinonitrile system, N.B. Singh, U.S. Rai and O.P. Singh, *J. Cryst. Growth*, 71, 353, 1985.
2. Solubility equilibria of solid solutions of hydroxyl- and chlorapatites of arsenic, T.S.B.N. Raju, P. Lahiri, P.R. Yadava and U.S. Rai, *Polyhedron*, 4, 53, 1985.
3. Conversion of nitric oxide into a nitroxide radical using 2,3-dimethylbutadiene and 2,5-dimethyl- hexadiene, I.M. Gabr, U.S. Rai and M.C.R. Symons, *J. Chem. Soc. Chem. Comm.*, 1099, 1993.
4. Physical chemistry of organic eutectic and monotectic; Hexamethylbenzene-succinonitrile system, U.S. Rai and R.N. Rai, *Chemistry of Materials American Chem. Soc.*, 11, 3031, 1999.
5. Effect of polyacrylamide on the different properties of cement and mortar, U.S. Rai and R.K. Singh; *Materials Sc. and Engg. (A)*, 392, 42-50, 2005.
6. Selective Detection of Mercury (II) Ion Using Nonlinear Optical Properties of Gold Nanoparticles, Gopala Krishna Darbha, Anant Kumar Singh, Uma Shanker Rai, Eugene Yu, Hontao Yu and Paresh Chandra Ray, *J. Am. Chem. Soc.*, 120(25), 8038-8043, 2008.
7. Gold Nanorod Based Sensing of Sequence Specific HIV-1 Virus DNA using Hyper Rayleigh Scattering Spectroscopy, Gopala Krishna Darbha, Uma Shanker Rai, Anant Kumar Singh and Paresh Chandra Ray, *Chem. European Journal*, 14, 3896-3904, 2008.
8. Gold nanoparticle based surface enhanced fluorescence for detection of organophosphorus agents, Samuel S.R. Dasary, Uma S. Rai, Hongtao Yu, Yerramilli Anjaneyulu, Madan Dubey, Paresh Chandra Ray, *Chemical Physics Letters*, 460, 187-190, 2008.
9. Challenge in understanding size and shape dependent toxicity of gold nanoparticles in human skin keratinocytes. Wang, Wentong Lu, Oleg Tovmachenko, Uma Shanker Rai, Hongtao Yu and Paresh Chandra Ray, *Chemical Physics Letters*, 463, 145-149, 2008.
10. Yttrium copper titanate as a highly efficient electro-catalyst for oxygen reduction reaction in fuel cells, synthesized via ultrafast automatic flame technique, Laxman Singh, Uday Pratap Azad, Satendra Pal Singh, Vellaichamy Ganeshan, U.S. Rai and

9. Additional Information/ Achievements: NIL

**Full List of Publications:**

1.	Quantitative separation of calcium, barium and arsenate, T.S.B. Narasaraju, <b>U.S. Rai</b> and Misri Lal, J. Sci. Res., 22, 203, 1971-72.
2.	New methods of analyses of solid solution of calcium, strontium and barium ferrites, T.S.B. Narasaraju, Misri Lal and <b>U.S. Rai</b> , J. Sci. Res., 22, 205, 1971-72
3.	Volumetric analysis of chlorapatite, T.S.B. Narasaraju, K.K. Rao and <b>U.S. Rai</b> , J. Sci. Res., 24, 24, 1973-74.
4.	Quantitative separation of calcium, phosphate and arsenate, T.S.B.N. Raju, <b>U.S. Rai</b> and K.K. Rao, J. Sci. Res., 25, 49, 1975.
5.	Solubility equilibria of solid solutions of calcium and barium hydroxylapatite, T.S.B.N. Raju, V.L.N. Rao, Misri Lal and <b>U.S. Rai</b> , Ind. J. Chem., 13, 369, 1975.
6.	Complexometric analyses of alkaline earth monoferrites, T.S.B.N. Raju, Misri Lal and <b>U.S. Rai</b> , J. Sci. Res., 17, 139, 1976.
7.	Preparation, characterization and solubility of arsenic hydroxylapatite, T.S.B.N. Raju, K.K. Rao, U.S. Rai and B.K. Kapoor, Indian. J. Chem., 15A, 1014, 1977.
8.	Some physicochemical aspects of chlorapatite, T.S.B.N. Raju, <b>U.S. Rai</b> and K.K. Rao, Ind. J. Chem., 16A, 152, 1978.
9.	Some thermodynamic aspects of dissolution of solid solutions of hydroxylapatites of phosphorus and arsenic, T.S.B.N. Raju and <b>U.S. Rai</b> , Candian J. Chem., 57, 2662, 1979.
10.	Nature of water in phosphorus hydroxylapatite and arsenic hydroxylapatite and their solid solutions, T.S.B.N. Raju, B.K. Kapoor and <b>U.S. Rai</b> , Ind. J. Chem., 18, 257, 1979.
11.	Determination of solubility products of hydroxylapatite, chlorapatite and their solid solutions, T.S.B.N. Raju, K.K. Rao and <b>U.S. Rai</b> , Candian J. Chem., 57, 1919, 1979.
12.	Preparation and characterization of solid solutions of hydroxylapatite and chlorapatite of cadmium, T.S.B.N. Raju, B.K. Kapoor, K.K. Rao and <b>U.S. Rai</b> , Ind. J. Chem., 17A, 292, 1979.
13.	Preparation and characterization of solid solutions of hydroxylapatite and chlorapatite, <b>U.S. Rai</b> , K.K. Rao and T.S.B.N. Raju, Indian. J. Chem., 18, 168, 1979.
14.	Preparation and characterization of hydroxylapatite of phosphorus and arsenic and their solid solutions, T.S.B.N. Raju, K.K. Rao and <b>U.S. Rai</b> , Indian. J. Chem., 17A, 293, 1979.
15.	Solid solution series of hydroxyl and chlorapatites of arsenic-preparation and characterization, T.S.B.N. Raju, P. Lahiri, P.R. Yadava and <b>U.S. Rai</b> , Current Science, 51, 772, 1982.

16.	Studies on adsorption of phosphate ions on stannic oxide by radioactive tracer technique, V.N. Singh, I.S. Singh and <b>U.S. Rai</b> , Ind. J. Chem., 21A, 247, 1982.
17.	Thermoanalytical and surface area measurements of hydroxylapatite, Chlorapatite and their solid solutions, T.S.B.N. Raju, K.K. Rao, P. Lahiri and <b>U.S. Rai</b> , J. Sci. Res., 33(2), 41, 1982-83.
18.	Quantitative separation of calcium and phosphate through a potentiometric Hg-EDTA titration, T.S.B.N. Raju, P. Lahiri, P.R. Ram and <b>U.S. Rai</b> , Acta. Ciencia. Indica, 9, 89, 1983.
19.	Excess thermodynamic functions for a simple eutectic; m-aminophenol-pyrogallol system, <b>U.S. Rai</b> , O.P. Singh, N.P. Singh and N.B. Singh, Thermochemica Acta., 71, 373, 1983.
20.	Surface properties of antimony tetroxide, V.N. Singh, I.S. Singh, <b>U.S. Rai</b> and N.P. Singh, Ind. J. Tech., 22, 72, 1984.
21.	Solidification behaviour of monotectic alloys; phenanthrene-succinonitrile system, <b>U.S. Rai</b> , O.P. Singh, N.B. Singh and N. Singh, Int. Conf. Prog. In Metallurgical Res.: Fundamental and Applied Aspects, I.I.T. Kanpur, India During February 11-15, 1985, p. 613.
22.	Chemistry of organic eutectics, N. Singh, <b>U.S. Rai</b> , O.P. Singh and N.B. Singh, J. Sci. Res., 35, 1, 1985.
23.	Solubility equilibria of solid solutions of hydroxyl- and chlorapatites of arsenic, T.S.B.N. Raju, P. Lahiri, P.R. Yadava and <b>U.S. Rai</b> , Polyhedron, 4, 53, 1985.
24.	Solidification behaviour of monotectic alloys; phenanthrene-succinonitrile system, <b>U.S. Rai</b> , O.P. Singh, N.P. Singh and N.B. Singh, Indian J. Pure Applied Physics, 23, 430, 1985.
25.	Chemistry of eutectic and monotectic; phenanthrene-succinonitrile system, N.B. Singh, <b>U.S. Rai</b> and O.P. Singh, J. Cryst. Growth, 71, 353, 1985.
26.	Structure of eutectic melt; binary organic system, N. Singh, N.B. Singh, <b>U.S. Rai</b> and O.P. Singh, Thermochem. Acta, 95, 291, 1985.
27.	Some thermodynamic aspects of organic eutectic; succinonitrile-phenanthrene system, <b>U.S. Rai</b> , O.P. Singh and N.B. Singh, Ind. J. Chem., 26A, 947, 1987.
28.	Microanalytical determination of calcium, phosphate and arsenate including kinetics of formation of molybdenum blue from reduction of molybdoarsenic acid by ferrous ammonium sulphate, T.S.B.N. Raju and <b>U.S. Rai</b> , Canadian J. Chem., 65, 1313, 1987.
29.	Solidification behaviour of organic eutectic; succinonitrile-neopentyl alcohol system, <b>U.S. Rai</b> , O.P. Singh and N.B. Singh, J. Chimie. Phys., 84, 483, 1987.
30.	Some thermodynamic aspects of organic eutectic in a monotectic type system, <b>U.S. Rai</b> , O.P. Singh and N.B. Singh, Canadian J. Chem., 65, 2639, 1987.

31.	Some physicochemical studies on organic eutectics and 1,1-addition compounds ;p-phenylenediamine-resorcinol and p-phenylenediamine catechol systems, <b>U.S. Rai</b> and K.D. Mandal, Acta Chimica, Hung., 125, 473, 1988.
32.	Solidification behaviour of organic eutectics and 1,1-addition compound; p-phenylenediamine-resorcinol system, <b>U.S. Rai</b> and K.D. Mandal, Cryst. Res. Technol., 23, 871, 1988.
33.	Some physicochemical studies on organic eutectic and 1,2- addition compounds; p-phenylenediamine-??-naphthol and p-phenylenediamine-?-naphthol systems, <b>U.S. Rai</b> and K.D. Mandal, Curr. Sci. 58, 784, 1989.
34.	Chemistry of organic eutectics and 1,1-addition compound; p-phenylenediamine, catechol system, <b>U.S. Rai</b> and K.D. Mandal, Thermochem. Acta, 138, 219, 1989.
35.	Some physicochemical studies on organic eutectics and 1,1-addition compound; p-phenylenediamine-benzoic acid system, <b>U.S. Rai</b> and K.D. Mandal, Canadian J. Chem., 67, 239, 1989.
36.	Solidification behaviour of organic eutectics and molecular complexes, <b>U.S. Rai</b> and K.D. Mandal, Materials Science Forum, 50, 117, 1989.
37.	Some thermochemical studies on organic eutectics and molecular complexes; <b>U.S. Rai</b> , K.D. Mandal and N.P. Singh, J. Thermal Analysis, 35, 1687, 1989.
38.	Effect of impurity on the growth rates and morphology of dendritic crystals, N.B. Singh, N. Singh, <b>U.S. Rai</b> , O.P. Singh and M.E. Glicksman, Materials Science Forum, 50, 79, 1989.
39.	Chemistry of organic eutectics and 1:2 addition compounds; p-Phenylenediamine-m-nitrobenzoic acid system, <b>U.S. Rai</b> and K.D. Mandal, Bull. Chem. Soc. Jpn., 63, 1496, 1990.
40.	Solidification behaviour of eutectics and monotectic alloys; Succinonitrile-acenaphthene system, <b>U.S. Rai</b> and H. Shekhar, Cryst. Res. Technol., 25, 1425, 1990.
41.	Some physicochemical studies on organic eutectics and addition compounds, <b>U.S. Rai</b> and K.D. Mandal, Mol. Cryst. Liq. Cryst., 182, 387, 1990.
42.	Chemistry of organic eutectics and 1:2 molecular complexes ; p-phenylenediamine-?-naphthol and o-chloranil-naphthalene systems, <b>U.S. Rai</b> and K.D. Mandal, Z. Physik. Chem., 271, 197, 1990.
43.	Chemistry of organic eutectics; phenanthrene-benzoic acid and phenanthrene-cinnamic acid systems, <b>U.S. Rai</b> and H. Shekhar, Cryst. Res. Technol., 25, 771, 1990.
44.	Effect of doping on the kinetics and morphology of succinonitrile, O.P. Singh, <b>U.S. Rai</b> , N.B. Singh and M.E. Glicksman, Mechanical Engineering Forum, 1990.

45.	Some physicochemical studies on binary organic eutectics, <b>U.S. Rai</b> and H. Shekhar, <i>Thermochim. Acta</i> , 63, 215, 1991.
46.	Some physicochemical studies on binary organic eutectics and 1:2 molecular complexes, <b>U.S. Rai</b> and Santhi George, <i>Cryst. Res. Technol.</i> , 26, 511, 1991.
47.	Some physicochemical studies on binary organic eutectics, <b>U.S. Rai</b> and H. Shekhar, National Seminar on Solid State Chemistry and Allied Areas, Chem. Deptt., Institute of Science, Nagpur, 536, 1991.
48.	Study of the eutectic and monotectic of acenaphthene-succinonitrile system, <b>U.S. Rai</b> and H. Shekhar, <i>Thermochim. Acta</i> , 186, 131, 1991.
49.	Some physicochemical studies on organic eutectics and 1:2 addition compound; benzidine-catechol system, <b>U.S. Rai</b> and Santhi George, <i>Rivista Italiana Delle Sos. Grasse</i> , 58, 427, 1991.
50.	Some physicochemical studies on organic eutectics and 1:2 addition compound; benzidine- $\beta$ -naphthol system, <b>U.S. Rai</b> and Santhi George, <i>Thermochim. Acta</i> , 191, 271, 1991.
51.	Organic eutectics and addition compounds; A physicochemical study, <b>U.S. Rai</b> and Santhi George, <i>Polish J. Chem.</i> , 66, 375, 1992.
52.	Some physicochemical studies on organic eutectics and 1:1 addition compounds; benzidine- $\beta$ -naphthol system, <b>U.S. Rai</b> and Santhi George, <i>J. Materials Science</i> , 27, 711, 1992.
53.	Chemistry of binary organic eutectics and molecular complexes; phenanthrene-m-nitrobenzoic acid system, <b>U.S. Rai</b> and H. Shekhar, <i>Mol. Cryst. Liq. Cryst.</i> , 220, 217, 1992.
54.	A physicochemical study of organic eutectics and addition compounds; benzidine-pyrogallol system, <b>U.S. Rai</b> and Santhi George, <i>Canadian J. Chem.</i> , 70, 2869, 1992.
55.	Conversion of nitric oxide into a nitroxide radical using 2,3-dimethylbutadiene and 2,5-dimethyl-hexadiene, I.M. Gabr, <b>U.S. Rai</b> and M.C.R. Symons, <i>J. Chem. Soc. Chem. Comm.</i> , 1099, 1993.
56.	Dichotomy in dissociative electron capture; electron paramagnetic resonance detection of iodine atoms in methanol glasses, <b>U.S. Rai</b> , M.C.R. Symons, J.L. Wyatt and W.R. Bowman, <i>J. Chem. Soc., Faraday Trans.</i> , 89, 1199, 1993.
57.	Direct observation on solidification of binary organic alloys, <b>U.S. Rai</b> and H. Shekhar, <i>J. Thermal Analysis</i> , 39, 415, 1993.
58.	Electron addition to trimethyl phosphite induced by ionizing radiation; an ESR study, G.D.G. Mconnachie, <b>U.S. Rai</b> and M.C.R. Symons, <i>J. Molecular Structure</i> , 300, 527, 1993.
59.	Electron loss centres from methylmercury hydride, dimethyl cadmium and diethyl cadmium; an EPR study, <b>U.S. Rai</b> and others, <i>J. Chem. Soc., Faraday Trans.</i> , 90, 3153, 1994.

60.	Solidification behaviour of binary organic eutectics and addition compounds, <b>U.S. Rai</b> and Santhi George, Korean Chem. Soc., 15, 193, 1994.
61.	Solidification behaviour of binary organic eutectic alloys, <b>U.S. Rai</b> and H. Shekhar, Cryst. Res. Technol., 29, 533, 1994.
62.	Some thermochemical studies on binary organic eutectics and addition compounds, <b>U.S. Rai</b> and Santhi George, Thermochim Acta., 243, 17, 1994.
63.	EPR data do not support the P=O representation for trialkyl phosphates and phosphineoxides or sulphides, <b>U.S. Rai</b> and M.C.R. Symons, J. Chem. Soc., Faraday Trans., 90, 2649, 1994.
64.	Some physicochemical studies on binary organic eutectics and 1:1 addition compound; benzidine–p-nitrophenol system, <b>U.S. Rai</b> , J. Cryst. Growth, 144, 291, 1994.
65.	Phase diagram and crystallization behaviour of binary organic eutectics, <b>U.S. Rai</b> , R.N. Rai and J.P. Pandey, Thermans, 10, 72, 1995.
66.	Phase diagram and thermal properties of binary organic eutectics, <b>U.S. Rai</b> and R.N. Rai, Thermans, 10, 74, 1995.
67.	Electron addition to triethylphosphite induced by ionizing radiation: An ESR study, <b>U.S. Rai</b> , Ind. J. Chem., 34A, 692, 1995.
68.	Some thermochemical studies on binary faceted organic eutectics and 1:1 molecular complexes, <b>U.S. Rai</b> and Santhi George, J. Thermal Analysis, 46, 1809, 1996.
69.	Solidification behaviour of binary organic monotectic alloys, <b>U.S. Rai</b> and R.N. Rai, Thermochim. Acta, 277, 209, 1996.
70.	Solidification behaviour of binary organic eutectics, <b>U.S. Rai</b> and R.N. Rai, Polish J. Appl. Chem., 40, 281, 1996.
71.	Some physicochemical studies on binary organic eutectics and 1:1 addition compound; urea-p- nitrophenol and urea–m-nitrobenzoic acid systems, <b>U.S. Rai</b> and R.N. Rai, ACH Models in Chem., 135 341, 1996.
72.	Studies on physicochemical properties of eutectic and monotectic of urea p- chloronitrobenzene system, <b>U.S. Rai</b> and R.N. Rai, J. Cryst. Growth, 169, 563, 1996.
73.	Some physicochemical studies on organic analogue of metal-nonmetal eutectics, <b>U.S. Rai</b> and R.N. Rai, Cryst. Res. Technol., 32, 821, 1997.
74.	Chemistry and characterization of binary organic eutectics and molecular complexes; urea-m-nitrobenzoic acid system, <b>U.S. Rai</b> and R.N. Rai, Materials Letters, 34, 67, 1998.
75.	Physicochemical properties of organic eutectics and 1:1 molecular complex of urea-resorcinol system, <b>U.S. Rai</b> and R.N. Rai, Molecular Materials, 9, 235, 1998.
76.	Physical chemistry of organic analogue of metal-metal eutectics and monotectic alloys, <b>U.S. Rai</b> and R.N. Rai, J. Cryst. Growth, 191, 234, 1998.

78.	Chemistry and characterization of binary organic eutectics, <b>U.S. Rai</b> and R.N. Rai, Asian J. Chem., 10, 421, 1998.
79.	Physical chemistry of organic eutectics, <b>U.S. Rai</b> and R.N. Rai, J. Thermal Analysis, 53, 883, 1998.
80.	Phase diagram and thermochemical properties of organic eutectic in a monotectic system, <b>U.S. Rai</b> and R.N. Rai, Bull. Mater. Sci., 21, 203, 1998.
81.	Some physicochemical studies of organic eutectics and molecular complex; urea-p-nitrophenol system, <b>U.S. Rai</b> and R.N. Rai, J. Mater. Res., 14, 1299, 1999.
82.	Solidification behaviour of binary organic eutectics and monotectic; 1,2,4,5-tetrachlorobenzene-m-aminophenol system, <b>U.S. Rai</b> and P. Pandey, Materials Letter, 39, 166, 1999.
83.	Physical chemistry of binary organic analogues of nonmetal-nonmetal eutectics, <b>U.S. Rai</b> and H. Shekher, Asian J. Chem., 11, 453, 1999.
84.	Physical chemistry of organic eutectic and monotectic; Hexamethylbenzene-succinonitrile system, <b>U.S. Rai</b> and R.N. Rai, Chemistry of Materials American Chem. Soc., 11, 3031, 1999.
85.	Physical chemistry of binary organic eutectic and monotectic alloys; 1,2,4,5-tetrachlorobenzene- $\beta$ -naphthol and 1,2,4,5-tetramethylbenzene-succinonitrile systems, <b>U.S. Rai</b> , Pinky Pandey and R.N. Rai, J. Cryst. Growth, 220, 610, 2000.
86.	Physical chemistry of binary organic eutectic and monoeutectic alloys; durene-pyrogallol system, <b>U.S. Rai</b> and Pinky Pandey, Thermochim. Acta, 364, 111, 2000.
87.	Physical chemistry of binary organic monotectic alloys; 1,2,4,5-tetrachlorobenzene-pyrogallol system, <b>U.S. Rai</b> and Pinky Pandey, Mol. Materials, 12, 13, 2000.
88.	Solid-liquid equilibrium and thermochemical properties of organic eutectic in a monotectic system, R.N. Rai and <b>U.S. Rai</b> , Thermochim. Acta, 363, 23, 2000. , 363, 23, 2000.
89.	U.S.Rai, Letter to the Editor, Indian J. Chem., 40A, 2001, 901.
90..	Physical chemistry of binary organic eutectic and monotectic alloys; 1,2,4,5-tetrachlorobenzene (TCB)- $\beta$ -naphthol and TCB-resorcinol systems, <b>U.S. Rai</b> , Pinky Pandey and R.N. Rai, Materials Letters, 53, 83, 2002.
91.	Phase diagram and crystallization behaviour of organic eutectics and monotectic; 1,4-dibromobenzene-resorcinol system, <b>U.S. Rai</b> and Pinky Pandey, Thermans, 13, 146, 2002.
92.	Thermal, miscibility gap and microstructural studies of organic analogue of metal-nonmetal system; p-dibromobenzene -succinonitrile system, R.N. Rai, <b>U.S. Rai</b> and K.B.R. Verma, Thermochim.. Acta, 387, 101, 2002.
93.	Crystallization behaviour of metal-nonmetal monotectic alloys; succinonitrile-pyrene system, <b>U.S. Rai</b> and Pinky Pandey, Progress in Crystal Growth and Characterization of Materials, 45, 59, 2002.
94.	Phase-diagram and growth behaviour of Durene-Resorcinol system, <b>U.S. Rai</b> and P. Pandey, J. Thermal Analysis and Calorimetry, 67, 535, 2002.



95.	Solidification and thermal behaviour of binary organic eutectic and monotectic; succinonitrile pyrene system, <b>U.S. Rai</b> and Pinky Pandey, J. Cryst. Growth, 249, 301, 2003.
96.	Physicochemical studies on organic eutectic and monotectic alloys; 1,4-dibromobenzene-resorcinol system, <b>U.S. Rai</b> and Pinky Pandey, J. of Thermal Analysis and Calorimetry, 74, 141, 2003.
97.	Synthesis and mechanical characterization of polystyrene-matrix composites containing calcium carbonate or white cement filler, <b>U.S. Rai</b> and R.K. Singh, Materials Letters, 58, 235, 2003.
98.	Synthesis and Characterization of Polyvinyl alcohol filled cement matrix composite, <b>U. S. Rai</b> and R. K. Singh, Thermans, 14, 272, 2004.
99.	Solidification and thermal behaviour of organic Eutectics; 1,2,4,5-tetrachlorobenzene (TCB)-Acenaphthalene & TCB-catechol systems; <b>U. S. Rai</b> and Sudha Singh, Thermans, 14, 157, 2004.
100.	Some physicochemical studies on binary organic eutectics and monotectic alloys; p-dibromobenzene-m-aminophenol system, <b>U.S. Rai</b> and Pinky Pandey, Materials Letters, 58, 2943, 2004.
101.	Some Physicochemical studies on binary organic eutectics and addition compounds; durene-carbontetrabromide system <b>U. S. Rai</b> and Pinky Pandey, Thermans, 14, 164, 2004.
102.	Some Physicochemical studies on binary organic eutectics and monotectic; Acetamide-Pyrene system <b>U. S. Rai</b> and Sudha Singh, Thermans, 14, 164, 2004.
103	Effect of polyacrylamide on the different properties of cement and mortar, <b>U.S. Rai</b> and R.K. Singh; Materials Sc. and Engg. (A), 392, 42, 2005.
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