BIO DATA

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Qualifications: M.Sc. , Ph.D from IIT Bombay

Present Position: Principal Research Scientist

Nature of Work:

Research and development in Magnetism and magnetic materials . I have been actively involved in guiding two Ph.D students, 10 M.Tech students and three B.Tech students in Materials science/ Physics in the area of ceramic materials-synthesis and characterisation. I have also successfully worked on several sponsored and consultancy projects as one of the investigators and successfully completed these projects. In the course of these investigations I have tackled several problems faced in the development of ceramic based materials and their characterization I have published about 37 papers in International/ national journals and conference Proceedings.

Salient features of work done:

Developed low loss garnets and ferrites for circulator applications comparable to imported materials developed (About 200 pcs were supplied to SAMEER, Bombay) by controlling the processing conditions

Independent control of grain growth and densification of ferrites using hot pressing in a setup designed and fabricated inhouse. This was used to develop hot pressed Mn-Zn ferrites (permeabilities > 4500) as well as garnets with controlled grain size. The permeability spectra of garnets was studied and relaxation studies reported.

Microwave absorbing paints based on ferrites developed and characterized. A project on computer aided design of these materials was undertaken and materials with absorption of about 10db for 1 mm thick paints in the X band was achieved.

Good quality thin films of high Tc superconductors suitable for microwave planar circuits have been deposited on alumina and MgO. High Q microwave cavity with Q ~ 30,000 in Ku band has been obtained

A low cost vibrating sample magnetometer was designed and fabricated under a project from DST. The technology has been transferred to a vendor in Mumbai. The cost of the instrument is a fraction of the cost of an imported instrument.

Several projects on thin films of ferrites and oxide materials with nano-crystalline structure were prepared by sputtering. These materials have properties much different from the bulk. Some studies to understand this difference has been carried out, using partial phase of superparamagnetic grains in presence of ferromagnetic grains.
Numerical methods in electromagnetic field problems: Some work on finite element method, boundary element method and finite difference time domain method has been done for problems in microwave magnetics like RCS, scattering and measurement of permeability at microwave frequencies.

LIST OF PUBLICATIONS

I Papers in refereed journals:

1 C.M.Srivastava, Om Prakash and R.Aiyar: Permeability spectrum of garnets, Mater. Sci. Bull. (India), 1, 49 (1979)

2 Om Prakash, C.M Srivastava and R. Aiyar: Dependence of permeability spectrum on microstructure, Jour. Magn.and Magn Mater. 15-18, 1521 (1980)

3 C.M.Srivastava, C.Srinivasan and R.. Aiyar: Exchange constants in ferrimagnetic garnets, Mater Sci. Bull. (India), 2, 187 (1980)

4 G.Srinivasan, Om Prakash and R.Aiyar: Domain rotation and wall displacement contribution to permeability in YIG, Phys. Stat. Solidi(a), 59, 301 (1980)

5 C.M.Srivastava, Om Prakash And R.Aiyar: Magnetic relaxation in polycrystalline garnets, Phys. Stat. Solidi(a), 64, 787 (1981)

6 C.M.Srivastava, C.Srinivasan and R.. Aiyar: Exchange constants in ferrimagnetic garnets, Jour. Appl. Phys. 53, 781 (1982)

7 N.Venkataramani, R.Aiyar, P.S. Sekhar and C.M. Srivastava: Dependence of microstructure on process variables in Mn-Zn ferrites, Bull. Mater. Sci. (India), 6, 65 (1984)

8 C.M.Srivastava, C.Srinivasan and R.Aiyar: Influence of spin-orbit coupling and lanthanide contraction on exchange in rare earth garnets, Bull. Mater. Sci. (India), 6 1069 (1984)

9 C.M.Srivastava and R.. Aiyar: Spin wave stiffness in ferrimagnetic garnets, Jour. Phys. C(Solid State), 20, 1119 (1987)

10 Om Prakash, N.Venkataramani, S.N. Bhatia, R.Aiyar, R. Walia and C.M. Srivastava: Phase dependent

superconductivity in the Y-Ba-Cu-O system, Pramana Jour. Phys. 29, 1103 (1987)

11 K.D.Patil, S.K. Maiti, S. Mahapatra and R.Aiyar: Use of infinite elements for potential problems, Jour. IETE 38, 299 (1992)

12 A Bhattacharya, R. Aiyar and Om Prakash: Levitation studies on 1-2-3- cuprate superconductors: Asian Journal of Physics 6, 196(1997)

13 S.M. Abbas, R. Aiyar and Om Prakash: Synthesis and microwave absorption studies of ferrite paint: Bull. Mater. Sci. 21, 263 (1998)

14 R.P.R.C Aiyar: Microwave absorbers based on hexaferrites: Microwave and Optical Technology Letters, 23(5), 321, (1999)

15 J. Dash, R.P.R.C. Aiyar, Shiva Prasad, N. Venkataramani, S.K. Date, S.D. Kulkarni, Pran Kishan and Nitendra Kumar: The effect of Zn on the defects in sputter deposited Li-Zn ferrite films: Jour. Magn and Magn. Mater. 226-230, 1636 (2001)

16 R.P.R.C. Aiyar: Improvements in boundary element solutions, Under review for publication in COMPEL journal-special issue

17 S.V Kulkarni, R.P.R.C. Aiyar and R.K. Shevgaonkar: Computational Electronagnetics- Issues, Trends and Applications, , Under review for publication in COMPEL journal-special issue

18 S Kumar, G.B. Kumbhar, S.V Kulkarni, R.P.R.C. Aiyar and S.V Desai: Electromagnetic forming-A case study of coupled magneto-mechanical formulation, , Under review for publication in COMPEL journal-special issue

II. Papers in conference proceedings:

1 C.Srinivasan, Om Prakash and R.Aiyar: Susceptibility critical exponents for some mixed garnets, Proc. Nucl.Phys Solid State Phys. Symp. 20C, 418 (1977)

2 C.M.Srivastava, C.Srinivasan and R.Aiyar: Exchange constants in Yttrium and gadolinium garnets, Proc. Nucl. Phys Solid State Phys. Symp. 21C, 595 (1978)

3 Om Prakash and R.Aiyar: Correlation between damping constants β and λ in polycrystalline garnets, Proc. Nucl. Phys Solid State Phys. Symp. 22, 546 (1979)

4 C.M.Srivastava, M.J.Patni, R.Aiyar and N.S.H.Rao: Magnetic resonance studies of $Dy_xY_{3-x}Fe5O_{12}$ and $Gd_xY_{3-x}Fe5O_{12}$ below and above Neel temperature, Proc. Nucl.Phys Solid State Phys. Symp.24C, 421 (1981)

5 C.M.Srivastava and R.. Aiyar: Hot pressed magnetic materials, Proc. National Symposium on Instrumentation, Bangalore (1982) L1 - Invited talk

6 N.Venkataramani, R.Aiyar, P.S. Sekhar and C.M. Srivastava: Modified technique of hot pressing Mn-Zn Ferrites for recording head applications, Proc. International Symp. On Ceramics, Bangalore 6.12 (1982)

7 R.Aiyar, N.Venkataramani and C.M.Srivastava: Effective anisotropy in polycrystalline ferrrites, Proc. Solid State Phys. Symp. 28C, 170 (1985)

8 M.J.Patni, N.Venkataramani and R.Aiyar: Clustering of Fe^{2+} ions in high permeability ferrites, Proc. Solid State Phys. Symp. 28C, 277 (1985)

9 N.Venkataramani, R.Aiyar, and C.M. Srivastava: Studies on sintering mechanism and texturisation in hot pressed $(MnZnFe)Fe_2O_4$, Proc. International Conf. Ferrites-4, Advances In Ceramics, 15, 193 (Amer. Ceram. Soc., 1986)

10 N.Venkataramani, R.Aiyar, M.J.Patni and C.M.Srivastava: Processing of controlled microstructure Mn-Zn ferrites for recording head applications, Proc. International conf. On Powder Metallurgy, 225 (IBH 1986)

11 R.S. Parolia and R.Aiyar: Development of YIG material for 4/6 Ghz communication band circulators, Proc. 1st Asia Pacific microwave Conf. (New Delhi 1986), 680 (TMH 1988)

12 R.Aiyar, N.S.H. Rao, M.J. Patni and C.M.Srivastava: Synthesis of ferrite rods for phase shifter applications: Proc.

Seminar cum workshop on Advances in Ceramics, BHU, Varanasi, 29 (1988)

13 N.S.H. Rao, R.Aiyar, M.J. Patni and C.M.Srivastava: Synthesis and characterisation of dielectric materials for microwave applications: Proc. Seminar cum workshop on Advances in Ceramics, BHU, Varanasi, 31 (1988)

14 R.Aiyar, N.S.H. Rao, M.J. Patni and C.M. Srivastava: Development of ferrites and dielectrics for phase shifter applications, Proc. 2nd Asia Pacific Microwave conf. Beijing, 269 (1988)

15 R.Aiyar, N.S.H.Rao, S.A.Rane and C.M. Srivastava: Ba-Co-Ti based ferrite impregnated polyurethane paints as microwave absorbers, Advances in Ferrites, Proc. International Conf. Ferrites - 5, 955 (Oxford-IBH 1989)

16 G.M.Ganu, R.Aiyar and P.D.Prabhavalkar: Growth and characterisation of electrochemically formed thin film ferrite, Advances in Ferrites, Proc. International Conf. Ferrites - 5, 539 (Oxford-IBH 1989)

17 N.S.H.Rao, S.A.Rane and R.Aiyar: Effect of Fe^{2+} ions on magnetic loss in ferrimagnetic garnets, Advances in Ferrites, Proc. International Conf. Ferrites - 5, 1001 (Oxford-IBH 1989)

18 R.Aiyar and N.Venkataramani: Design of coils for vibrating sample magnetometer: Proc. Solid State Phys. Symp. 37C, 527 (1994)

19 N. Venkataramani and R. Aiyar : Results on an indigenous vibrating sample magnetometer, Proc. Solid State Phys. Symp. 40C, 40(1997)

20 R. Aiyar and N. Venkataramani: Optimisation of pickup coils for a vibrating sample magnetometer, Proc. Solid State Phys. Symp. 40C, 119 (1997),

21 Antony Ajan, N. Venkataramani, Shiva Prasad, S. N. Shringi, R. Aiyar, A.K. Nigam and R. Pinto: Proc. Solid State Phys. Symp. 40C, 152 (1997)

22 P. Ilavarasu, V.S. Raja, S.N. Soman, R. Aiyar and N. Venkataramani: Hydrogen content-phase transformation correlation to hydrogen embrittlement behaviour of a high manganese stainless steel: Proc. Annual Technical Meeting of the Indian Institute of Metals, Bangalore, 1998, p –163

23 J. Dash, R.P.R.C. Aiyar, Shiva Prasad, N. Venkataramani, S.K. Date, S.D. Kulkarni, Pran Kishan and Nitendra

Kumar: The effect of Zn on the defects in sputter deposited Li-Zn ferrite films: Proc. International conference on magnetism -2000, Recife Brazil

24 Prasanna D. Kulkarni, R.P.R.C. Aiyar, Shiva Prasad, N. Venkataramani, R. Krishnan, Wenjie Pang, Ayon Guha, R.C. Woodward and R.L. Stamps: superparamagnetism in nanocrystalline copper ferrite thin films Proc. International Conf. on Materials for Advanced Technology-2005 at Singapore – paper D-10-OR-40

25 R.P.R.C. Aiyar: Improvements in boundary element solutions, Proc. XII International Symposium on electromagnetic fields in mechatronics, electrical and electronic engineering Baiona Spain 15-17 Sept 2005 , p-EE-1.1(6 pages)

26 S.V Kulkarni, R.P.R.C. Aiyar and R.K. Shevgaonkar: Computational Electronagnetics- Issues, Trends and Applications, Proc. XII International Symposium on electromagnetic fields in mechatronics, electrical and electronic engineering Baiona Spain 15-17 Sept 2005 , p-CE-1.4(6 pages)

27 S Kumar, G.B. Kumbhar, S.V Kulkarni, R.P.R.C. Aiyar and S.V Desai: Electromagnetic forming-A case study of coupled magneto-mechanical formulation, Proc. XII International Symposium on electromagnetic fields in mechatronics, electrical and electronic engineering Baiona Spain 15-17 Sept 2005 , p-EE-2.2(6 pages)

III. Papers presented in conference but not published

1 S.Uma, R.Aiyar and C.M.Srivastava: Cobalt based ferrite for absorption of electromagnetic radiation, Presented at The National Conf. On Advanced Ceramics, Indian Institute of Technology, Bombay, Bombay 1990

2 S.Uma, M.J.Patni, C.M.Srivastava and R.Aiyar: Microwave absorption studies in substituted barium ferrite, Presented at the Spring Meeting of Materials Research Society (USA) 1993

3 R.Aiyar: Ferrites based radar absorbing materials, Proc. Workshop on signature management(SIGMA), ADA, Bangalore, 1994, p 4.8

4 R. Aiyar: Ferrite based radar absorbing materials: Presented at the Seminar-98 on stealth as applicable to Naval environment, Kochi 1998

5 Mrugesh Desai, J Dash, Shiva Prasad, I Samajdar, N Venkataramani, R P R C Aiyar, Pran Kishan and Nitendar Kumar: Grain size dependence on magnetic properties of sputter deposited lithium zinc ferrite thin films-poster presentation, Presented at the 16^{th} International Coll. On magnetic films and surfaces-2000, 13^{th} -18^{th} Aug. 2000, Natal Brazil