Abhijeet Vikram Kshirsagar.

Objective: - MEMS technology is the main field of interest, with core aptitude in RF MEMS, MEMS sensors and materials. With hands on experience on many Micro-Nanotechnology techniques. Strong inclination towards research and development.

Research skill Sets:-

- Micro-electromechanical Systems (MEMS) Software's
  - Coventor Ware 2006
  - IntelliSence
  - EM3DS
  - ANSYS multiphysics

- Hybrid Microelectronics
  - Hands on practice of following technologies.
    1. **Thick Film Technology.**
    2. **Thin Film Technology.**
    3. **Semiconductor and MEMS Technologies.**

  - Practice of fabrication, processing and characterization techniques used for above technologies.

  - Working experience on following equipments/ Instruments.
    1. For Thick Film Technology.
       Planetary Milling machine, Screen Printing machine, BTU four zone Furnace, Tube furnace, Single zone furnace, Julabo's TCR measuring equipment, Four-probe measuring instrument, Van Dar Paw instrument.
    2. For Thin Film and Semiconductor Technology.
       Physical Vapour Deposition, Hot-wire CVD, LPCVD, Magnetron Sputtering, RF sputtering, DC sputtering, Plasma Polymerization system, Silicon Oxidation furnace, Spin coating machine, Lithography.

- Other Skill sets.
  - ECAD software:- PSPICE, Xilinx, and AutoCAD
  - National Instruments Labview, Virtual Instrumentation software.
  - C programming.
  - Worked on both Windows and Linux Fedora platform.
  - Computer hardware / maintenance engineer.

Research Publications.

International Journals.

"Properties of leadless conductive thick films made from co-precipitated silver-palladium powders."
V. Deshpande, **Abhijeet Kshirsagar**, S. Rane*, T. Seth, G. J. Phatak, D. P. Amalnerkar.
Journal of Materials Chemistry and Physics, Vol. 93, (2005), pp 320-324.

"Microstructure and Electrical Performance of Eco-friendly Thick Film Resistor Composition Fired at different Firing Conditions."
Abhijeet Kshirsagar, S. Rane*, U. P. Mulik, D. P. Amalnerkar.
Materials Chemistry and Physics, Vol. 101, Issues 2-3, 15 February 2007, Pages 492-498

"Comparative study of Irradiated And Annealed ZnO Thin Films for Ammonia Gas Sensing."
Abhijeet Kshirsagar*, A. B. Joshi[#], Aditee Joshi[#], D. K. Avasthi[§], T. M. Bhave[#], S.A. Gangal*[#].; Submitted to IEEE Sensors 2007.

"Feasibility study of PMMA as a Sacrificial layer for low temperature MEMS"
In pipeline.

Conference and/or Seminar Publications.

"Properties of leadless conductive thick films made from co-precipitated silver-palladium powders."
V. Deshpande, **Abhijeet Kshirsagar**, S. Rane*, T. Seth, G. J. Phatak, D. P. Amalnerkar.
IMAPS Bangalore, 27th -28th Nov 04.

"Ammonia Gas Sensor using ZnO Thin Films."
Abhijeet Kshirsagar, A. B. Joshi, J. D. Deshpande, S. A. Gangal*.
NSIAE – 2006 (National seminar on Interdisciplinary Applications of Electronics.), Chopda, Maharashtra, 28th – 29th Jan 06.

"RF MEMS from Design Perspective."
Abhijeet Kshirsagar, S. A. Gangal*.
NSIAE – 2006 (National seminar on Interdisciplinary Applications of Electronics.), Chopda, Maharashtra, 28th – 29th Jan 06.

"Comparative Study of Irradiated And Annealed ZnO Thin Film For Room Temperature Ammonia Gas Sensing."
Abhijeet Kshirsagar, J. D. Deshpande, A. C. Joshi, A. B. Joshi, T. Seth, D. K. Avasthi, T. M. Bhave, S. A. Gangal*.
NSPTS – 11, Dept. of Electronic Science, University of Pune, 27th Feb to 1st Mar 06.

Educational Qualification

- Currently registered PhD student; working on **"Novel Surface And Bulk Micromachined, DC-Contact RF MEMS Series Switch Using PMMA/PTFE As A Sacrificial Layer."** at Dept. of Electronic Science, University of Pune.
- Obtained 7.2 GPA "Grade A" at M.Sc. Electronic Science, Dept. of Electronic Science, University of Pune.
- First Class with Distinction (73.25%) at B.Sc. Electronic Science examination conducted by University of Pune.
- Obtained Higher Second Class at both SSC (59.33%) and HSC (55.17%) examination conducted by Maharashtra State Board of Education.

PhD Abstract

Title:- **"Novel Surface And Bulk Micromachined, DC-Contact RF MEMS Series Switch Using PMMA/PTFE As A Sacrificial Layer."**

Guide :- **Prof. S.A.Gangal,** Dept. of Electronic Science University of Pune.
Co-guide:- **Prof. S. Duttagupta,** Dept. of Electrical Engineering, IIT Bombay.

Micromachining is a technology that enables the batch fabrication of miniature mechanical structures, devices and systems. In RF MEMS (Radio Frequency Micro Electro Mechanical Systems) technology components used for RF, microwave and millimeter wave systems such as switches, varactors, inductors, high Q-resonators, filters and antennas are made by microfabrication route.

The present project focuses on DC-Contact RF MEMS series switch for DC to 3 GHz applications. Standard RF MEMS series switch is fabricated with a cantilever that is surface micromachined. This project proposes to fabricate switch with "Grooved Anchor Concept" using both surface and bulk micromachining techniques. In Grooved Anchor Concept, the silicon wafer is first etched isotropically or anisotropically (which is bulk micromachining) and then cantilever is fabricated (which is surface micromachining) whose anchor base is in the groove. This grooved anchor is expected to increase the operating life of the switch. Different switch parameters such as actuation voltage, hold down voltage, switching time, insertion loss, isolation, series resistance will be measured. Comparison will be done of these parameters with the switch available in the market and reported in the literature.

In the second part of the project it is proposed to carry out experiments for feasibility of PMMA (Polymethyl Methacrylate)/PTFE (Polytetrafluoroethylene) as a sacrificial layer for RF MEMS fabrication. Studies on interface between PMMA/PTFE and silicon nitride, stress developed in the cantilever after release, maximum thickness obtained and other structural properties are planned. The result obtained will be interpreted in view of the ones available in the literature.

Research Experience.

No.	Duration	Place	Position	Topic
1.	May04 – July04. 3 months	Center for Materials For Electronics Technology. Pune-8.	Project Student	"Properties of Lead less conductive Thick films made from Co-precipitated Silver Palladium Powder."
2.	July04 – April05 10 months	Center for Materials For Electronics Technology. Pune-8.	Project Student	"Environment Friendly Thick Film Resistor."
3.	July05 – March06 9 months	Dept. of Electronic Science, University of Pune. Pune-7.	JRF	"Design and Development of Ammonia Gas Sensor."
4.	From May 06	Centre for Sensor Studies, Dept. of Electronic Science University of Pune Pune-7	JRF	"DC Contact RF MEMS Series Switch."
5.	From Dec 06 till date	Centre for Sensor Studies, Dept. of Electronic Science University of Pune Pune-7	SRF	"DC Contact RF MEMS Series Switch."

Projects

Major Projects

1. Design, Development, and Fabrication of Ammonia Gas Sensor.
2. Ultrasonic Air flow meter.
3. Bio-Protein based Optical Fiber gas sensor.
4. Optical Fiber based microbes Sensing.
5. Design and Fabrication of thin Film Nichrome Heater for Sensor Application.
6. Environment Friendly Thick Film Resistor.
7. Properties of Lead less conductive Thick films made from Co-precipitated Silver Palladium Powder.
8. Microprocessor Active Cooling System.

Minor Projects

1. Plasma Polymerization of Aniline.
2. PMMA as Humidity Sensor.
3. Design and Development of Gas Testing Unit for Sensor Application.
4. Fabrication of MOS – Capacitor.
5. Microcontroller based Robotic Arm using Stepper motor.
6. Traffic Light Control System.
7. Study and Design of Amplifiers.
8. Developed Graph Plotter Software.

Awards

Received Best Project Award given by Modern College of Arts, Commerce and Science to the Project "Microprocessors Active Cooling System" at B.Sc. level.

Conference/Seminar/Workshop attained.

1. National Seminar on Promotion of Basic Sciences as a Career, 16th – 18th Dec 02.
2. National Workshop on Advance Technique for Characterization of Nanomaterials. 28th Jun 05 – 2 July 05.
3. National seminar on Interdisciplinary Applications of Electronics (NSIAE-2006), Chopda, Maharashtra, 28th – 29th Jan 06.
4. Pre-Seminar Workshop on Updates of Sensor Instrumentation and Sensor Fabrication and Packaging, Organized by Dept. of Electronic Science, University of Pune, 25th – 26th Feb 06.
5. National Seminar on Physics and Technology of Sensors (NSPTS-11), Organized by Dept. of Electronic Science, University of Pune, 27th Feb 06 – 1st Mar 06.
6. IntelliSense Workshop, held at IITB on 11th - 12th Aug 06.

Extra Circular Activities.

1. Active participant and volunteer, of National Seminar on Promotion of Basic Sciences as a Career, during 16th – 18th Dec 02 at Graduation level.
2. Active participant and volunteer, both Pre-Seminar Workshop on Updates of Sensor Instrumentation and Sensor Fabrication and Packaging and National Seminar on Physics and Technology of Sensors (NSPTS-11).
3. Visited Inter-University Acceleration Centre (IUAC) previously known as Nuclear Science Centre, Delhi for Irradiation Experiment of ZnO Thin Films for Ammonia Gas Sensor.
4. Active participation in blood donation camp held at, Dept. of Electronic Science, University of Pune.

Personal Details

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University of Pune, Pune. Pin-411007.

Date of Birth: 8th March 1983.

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