

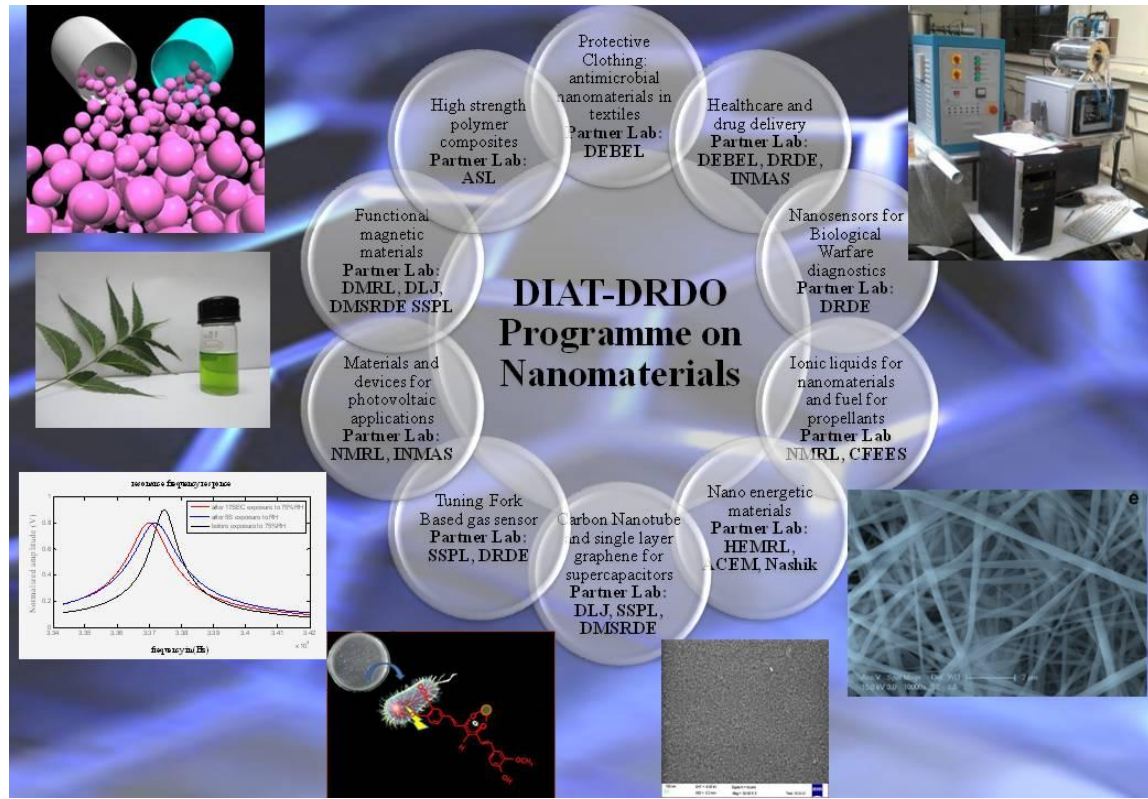
# DIAT-DRDO Programme on Nanomaterials Sanctioned by ER-IPER, DRDO on 13<sup>th</sup> April 2012

Sanction Date and Number: ERIP/ER/1003883/M/01/908/2012/D (R8D)/1416 Dated. 28.03.2012

Amount Sanctioned : Rs.43 Crores

Duration of the Project : 5 Years

## Programmes:



## Investigators

Dr. Sangeeta Kale, Prof.& Head, Dept. of Applied Physics, Principal Investigator

Dr. K. Balasubramanian, Assoc. Prof. & Head, Dept. of Mater Engg, Co-Investigator

Dr. Tejashree Bhawe, Asst Prof., Department of Applied Physics, Co-Investigator

Dr. Prashant Alegaonkar, Asst Prof, Department of Applied Physics, Co-Investigator

Dr. Ashutosh Abhyankar, Asst Prof., Dept of Mater Engg, Co-Investigator

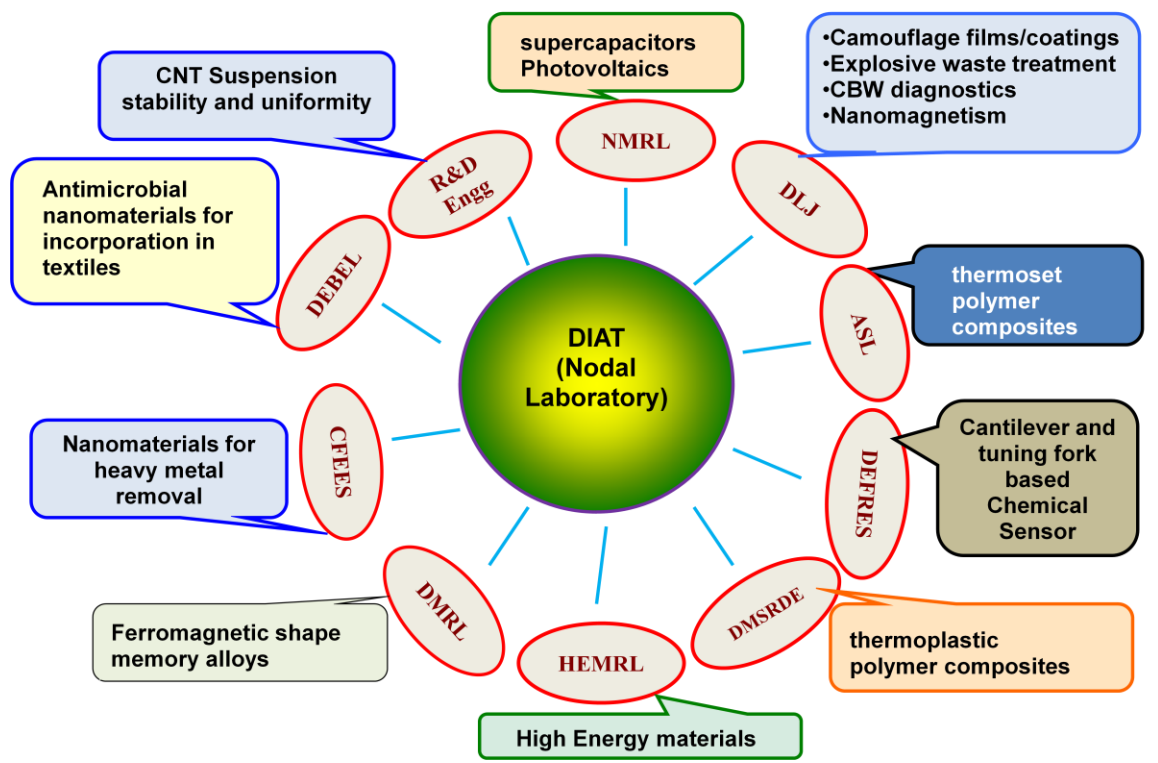
Dr. Suwarna Datar, Asst Prof., Department of Applied Physics, Co-Investigator

Dr. Prashant Kulkarni, Asst Prof., Department of Applied Chemistry, Co-Investigator

Dr. Shaibal Banerjee, Asst Prof., Department of Applied Chemistry, Co-Investigator



## Motivation: Identified DRDO Partners



## Work Plans

Sr.No	Name of WPI	Title of Work Plan
1	Prof S N Kale	a. Healthcare and drug delivery : Development of mesoporous patches for sustained drug release b. Nanosensors for chemical and biological warfare diagnostics
2	Dr. K. Balasubramanian	a. Protective Clothing b. Development of Textile Materials with Nanoadditives for Antimicrobial Activity
3	Dr. T.M.Bhave	a. Development of materials and devices for photovoltaic applications b. Drug Delivery
4	Dr. S.S.Datar	a. Tuning Fork Based Gas Sensor
5	Dr. A.C.Abhyankar	a. Functional Magnetic Materials
6	Dr. P.Kulkarni	a. Application of Ionic Liquids for Designing Nanomaterials and Fuel for Propellant
7	Dr. S. Banerjee	a. Synthesis and Applications of Nano Energetic Materials
8	Dr. P.S.Alegaonkar	a. Large scale synthesis of graphene, graphene oxide (GO) and carbon nanotubes for possible supercapacitor application

## Peer-reviewed Publications

Sr No	Name of PI / WPI	Title of publication	Publication details
1.	Prof. S. N. Kale	Observation of 10% Fe solubility in ammonia-coprecipitated Fe doped SnO <sub>2</sub> nanopowders: a structural, optical and hyperfine property study	Sandip Dhobale, Samuel, Benoit Lefez, Gauri Kulkarni, Béatrice Hannoyer, <b>Sangeeta Kale</b> Materials Focus Vol. 2, pp. 1–5, 2013
2	Prof. S. N. Kale	Zinc oxide nanomaterials as amylase inhibitors and for water pollution control	Rohini Kitture, Sandip Dhobale and <b>S.N. Kale</b> Invited Book Chapter in the "Springer Series in Materials Science" (in press)
3	Prof. S. N. Kale, Dr. S.S. Datar	Lithium Niobate Nanoparticulate Clad on the Core of Single Mode Optical Fiber for Temperature and Magnetic Field	Ch. N. Rao, Anoopam Bharadwaj, Suwarna Datar and <b>S.N. Kale</b> Applied Physics Letters 101, 043102 (2012)

		Sensing	
4	Dr.S.S.Datar, Prof. S.N. Kale	Conjugation of curcumin with PVP capped gold nanoparticles for improving bioavailability	Rajesh K Gangwar, V. A Dhumale, D. Kumari, U. Nakate, S W Gosavi, R.B Sharma, S.N Kale, <b>S. Datar</b> Mater Sc and Engg:C 32 (2012) 2659–2663
5	Dr. S. Banerjee	Energetic Plasticizers for Gun & Rocket Propellants,	D. Kumari, R. Balakshe, <b>S. Banerjee</b> , and H. Singh <i>Review Journal of Chemistry, 2012, Vol. 2, No. 3, pp. 240–262.</i>
6	Dr. S. Banerjee	Synthesis, Characterization, and Studies of PVA/Co-Doped ZnO Nanocomposite Films	Deepak Kumar, Suraj Karan Jat, Pawan K. Khanna, N. Vijayan, Shaibal Banerjee <i>International Journal of Green Nanotechnology</i> DOI: 10.1080/19430892.2012.738509
7	Dr.S.S. Datar Dr.P.S.Alegaonkar	Gold-graphene nanocomposite based ultrasensitive electrochemical glucose sensor	RK Gangwar, VA Dhumale, A Kumar, P Alegaonkar, RB Sharma, SS Datar IEEE Explore, 10.1109/ISPTS 6260947 Page(s): 282-285 2012.
8	Dr.S.S. Datar	Gold nanoparticles based ultrasensitive colorimetric sensor for Cd <sup>2+</sup> ions,	Vinayak A. Dhumale, Rajesh K. Gangwar, Suwarna Datar, Rishi B. Sharma Adv. Sci. Engg. Med. (Accepted for Publication) 2012
9	Dr. T. M. Bhave	Synthesis of Monodispersed Silica Nanoparticles for Antireflection Coatings	Rajesh K. Gangwar, Vinayak A. Dhumale, Tejashree M. Bhave, Ashwin Kale, Suresh W. Gosavi, and Rishi B. Sharma Advanced Science, Engineering and Medicine (In Press)

## Conference Presentations

Sr No	Name of PI	Title of paper presented	Details of conference
1.	Prof. S. N. Kale	Injury-sensitive sustained release of antimicrobial drugs	Poster Presentation – 5 <sup>th</sup> Bangalore Nano Dec 5-7, 2012
2	Prof. S. N. Kale	Temperature and UV light sensor using LiNbO <sub>3</sub> coated SMF Coupler Based on interference of reflective modes	Poster Presentation – 5 <sup>th</sup> Bangalore Nano Dec 5-7, 2012
3	Prof. S. N. Kale	Study of response of Au-Al <sub>2</sub> O <sub>3</sub> -Au trilayered metamaterials over the electromagnetic spectrum	Poster Presentation at “International Conference on Functional Materials for Defence (ICFMD-2012)”, Pune 18-20, 2012.
4	Prof. S. N. Kale Dr. S.S. Datar	Lithium Niobate Nanoparticles for Temperature and Magnetic Field Sensing	Poster Presentation at “International Conference on Functional Materials for Defence (ICFMD-2012)” Pune 18-20, 2012.
5	Prof. S. N. Kale	Antimicrobial studies on Cephalexin conjugated silica micro-particles: a promising system for sustained drug release	Poster Presentation at “International Conference on Functional Materials for Defence (ICFMD-2012)” Pune 18-20, 2012.
6	Prof. S. N. Kale	Microwave Synthesis of La <sub>0.3</sub> Sr <sub>0.7</sub> MnO <sub>3</sub> using PVA/Glycine as a fuel and its Applications	Poster Presentation at “International Conference on Functional Materials for Defence (ICFMD-2012)” Pune 18-20, 2012.
7	Prof.S.N. Kale Dr.P.S.Alegaonkar, Dr.S.S.Datar	Laser Assisted Nanomaterial Manipulation for EMI/EMC Applications	Poster Presentation at “International Conference on Functional Materials for Defence (ICFMD-2012)” Pune 18-20, 2012.
8	Dr.P.S. Alegaonkar, Dr. S.S. Datar	Electromagnetic Interference (EMI) Shielding using Graphene Nanoribbon – Polyaniline – PVA composite	Poster Presentation at “International Conference on Functional Materials for Defence (ICFMD-2012)” Pune 18-20, 2012.
9	Dr.Balasubramanian K. Dr. S.S. Datar	Polymer Gas sensors based on quartz tuning for chemical and bio-sensing application	Conference on Functional Materials for Defence (ICFMD-2012)” Pune 18-20, 2012.

10	Dr.S.S.Datar, Dr.A.C. Abhyankar, Dr.P.S. Alegaonkar.	Enhanced Pauli-spin susceptibility in Graphene-like nanocarbon sheets (GNCs)	Conference on Functional Materials for Defence (ICFMD- 2012)” Pune 18-20, 2012.
11	Dr. S.S. Datar	Biosynthesis of gold nanoparticles by Allamanda flower extract and its biomedical application	Conference on Functional Materials for Defence (ICFMD- 2012)” Pune 18-20, 2012.

## Patents

**Dr. Balasubramanian K.: MATERIALS AND METHOD FOR SYNTHESIS METALS.**

## Students joined

Sr no	Name of student	JRF/SRF/RA	Name of Investigator
1	Ms.Kalyani Date	R.A.	Dr.S.S.Datar
2	Mrs.Hema Singh	R.A.	Dr.S.Banerjee
3	Mrs.Rohini Kitture	S.R.F.	Prof.Sangeeta Kale
4	Mr.Shreeram Joglekar	J.R.F.	Dr.P.S.Alegaonkar
5	Mr.Sanjay Sahare	P.A.	Dr.T.M.Bhave
6	Mr.Sandesh Raut	P.A.	Dr.P.Kulkarni



## Newly arrived / Upcoming Equipments

Sr. No	Name of the item
1	X-Ray Diffraction System
2	Atomic Force Microscope
3.	BET Surface Area Analyser
4.	UV-vis Spectroscopy
5.	Laser Raman Spectroscope
6.	Chemical Vapor Deposition system
7.	Scanning Electron Microscope
8.	Transmission Electron Microscope
9.	Pulsed Laser Deposition system + Unit
10	Miscellaneous (Furnaces, Ovens, Solar Simulator, Microbalances..)

## Photos of Newly Arrived Equipments



DC-ARC Plasma



Surface Area Analyser



Atomic Force Microscope



**Laminar Air flow unit**



**Hydraulic press**



**Gas sensing setup**



## DRDO Liasons

Sr. No.	Name of DIAT Investigator	Name of DRDO partner	Area of Collaboration
1	Prof.Sangeeta Kale.	Dr. Kotresh/ Revaiah	Drug Delivery and sustained drug release
3	Prof.Sangeeta Kale.	Dr. VK Rao	Nanosensors for Biological warfare diagnostics
4	Dr.T.M.Bhave	Dr. Dwarakanath	Development and testing of nano particle based drug delivery system
5	Dr.P.S.Kulkarni	Dr. NM Patri Dr. Chitra Rajagopal Dr. RB Pawar	Applications of Ionic Liquids (ILs)
6	Dr.S. Banerjee	Dr. Venkatesan Mr. C.S. Pant	Synthesis and Applications of Nano Energetic Materials
7	Dr.P.S.Alegaonkar Dr.S.S. Datar	DMSRDE, DLJ and SSPL	Large scale synthesis of graphene, graphene oxide (GO) and carbon nanotubes for supercapacitor application
8	Dr.S.S. Datar	Dr. V. K. Rao	Tuning Fork Based Chemical Sensor
9	Dr.T.M. Bhave	Dr. M. Patri	Development of materials and devices for photovoltaic applications
10	Dr.A.C. Abhyankar	Dr. Sameer Kamat Dr. Manivel Raja S. M. Abbas	Functional Magnetic Materials
11	Dr.K. Balasubramanian	Dr. Kotresh	Development of Textile Materials with Nanoadditives for Antimicrobial Activity

## Other University / Institute Liasons

Sr. No	Name of DIAT Investigator	Name of Investigator and Partner Institute	Area of Collaboration
1	Prof.S.N.Kale	Asmita Prabhune NCL	Drug Delivery and sustained drug release
2	Prof.S.N.Kale	Lijiliana Fruk, KIT,GermanyL, Pune	Nanosensors for Biological warfare diagnostics
3	Dr.K. Balasubramanian	Dr Ashish Vaidya, Alok Industries Limited, Silvassa, Gujarat	Development of Textile Materials with Nanoadditives for Antimicrobial Activity