

Fifth SERC School on “New Developments in Microfabrication with Focus on Synchrotron Radiation based Deep X-ray Lithography”

October 29-November 03, 2012

Raja Ramanna Centre for Advanced Technology (RRCAT), Indore 452 013, India

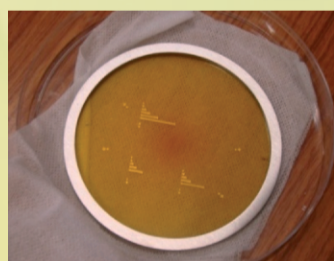
A series of schools on Micromachining and Microfabrication has been sponsored by the Science and Engineering Research Council (SERC), Department of Science and Technology, India. The fifth SERC Microfabrication school on “New Developments in Microfabrication with focus on Synchrotron Radiation based Deep X-ray Lithography” is being held at RRCAT, Indore from October 29-November 03, 2012.

RRCAT is a premier institute, engaged in research related to the development and applications of Accelerators and Lasers. It has two indigenously developed synchrotron radiation (SR) sources, namely; Indus-2 and Indus-1, which are national facilities. Indus-2 is presently operating at 2.5GeV energy and 100mA beam current. It has six X-ray beamlines in operation and are being used for undertaking research activities in various science frontiers like material science, archeology, etc. and cutting edge technologies such as materials studies in extreme conditions, lithography.

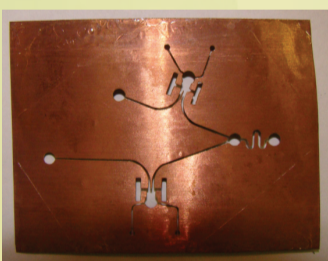
During the last two decades there had been a rapid progress in micro fabrication technology. These requirements have advanced following the societal, economical and technological thirst around the globe. The recent trends in micro and nano technology and advent of highly sophisticated instrumentation have made possible the development of micro electro mechanical systems (MEMS) for the end use in the field of micro mechanics, micro optics, sensors and actuators, medical science and bio-chemical engineering. UV lithography using Excimer laser and mercury lamp, electron beam lithography, ion beam lithography, electro-discharge machining, photo and electrochemical machining and X-ray lithography are being used for microfabrication. X-ray lithography beamline is setup on Indus-2 for fabrication of high aspect ratio micro structures. X-ray lithography is the most suited technique for fabrication of high aspect ratio (10-500) micro structures of size ($<5\ \mu\text{m}$) with flake angles $\sim 89^\circ$ and with sub-micron wall roughness.

The objective of the school is to provide an in depth knowledge on the new developments in microfabrication with emphasis on SR based X-ray lithography for high aspect ratio micro structures. The related topics covered will include: design and simulation, microfabrication processes, UV lithography, electron beam lithography, deep reactive ion etching, micromachining, laser machining, micro molding, electro forming, fabrication and integration of actual devices, micro finishing and micro metrology. The program will comprise of tutorial talks by experts from academia, case studies and discussion sessions, hands on training and visits to various laboratories at RRCAT involved in micro and nano fabrication.

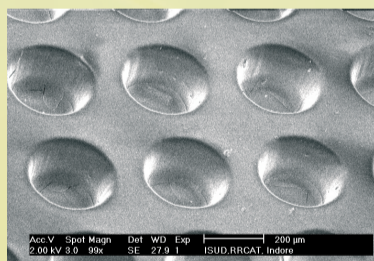
There is no course fee for participants from academic institutes. Candidates with M.E./M.Tech./M.Sc./Students doing Ph.D. in microfabrication/Ph.D. with active interest in microfabrication technologies or product development will be given preference. They will be paid to and fro II AC class train fare via the shortest route (strictly on the production of journey tickets), and free boarding and lodging at RRCAT guest house. The format of the application should be submitted online (www.srxrl.com). A hard copy of the filled online application duly recommended by the Head of Institution/Department, should reach RRCAT latest by August 17, 2012. The selected candidates will be asked to send a refundable caution deposit of ₹ 1000/- to ensure their commitment for participation in the school. The caution deposit will be returned only to those participants who have attended the school. Private and public sector industries are welcome to sponsor their executives, managers and engineers for the school. They will pay a registration fee of ₹ 5000/- per participant. Boarding and lodging for the sponsored candidates from industries can be arranged on payment basis in RRCAT guest house upon prior request and availability.



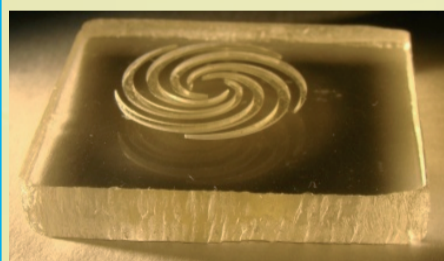
Fabricated polyimide membrane and Gold absorber X-ray mask for fine features.



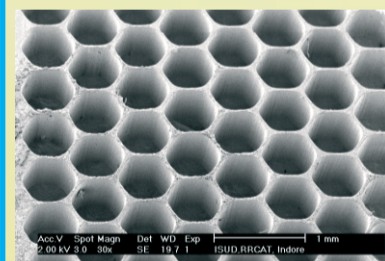
Low cost Copper X-ray Mask for coarser dimensions.



3 D (tapered) holes, top diameter 300 μm and bottom diameter 200 μm .



High-speed bearing structure fabricated in PMMA, maximum depth $\sim 800\mu\text{m}$ and $\sim 50\ \mu\text{m}$ structure at the edges.



High aspect ratio structures of Hexagonal patterns in PMMA, wall thickness 40 μm and depth is 800 μm .

National Advisory Committee

Dr. R.K. Sinha, DAE, Mumbai
Dr. S. Basu, BARC, Mumbai
Dr. P.D. Gupta, RRCAT, Indore
Prof. P. Radhakrishnan, PSGIAS, Coimbatore
Prof. V.K. Jain, IIT, Kanpur
Prof. S. Joshi, IIT, Mumbai
Prof. B. Bhattacharya, JU, Kolkata
Dr. N.V. Deshpande, NIT, Silchar
Prof. U.S. Dixit, IIT Guwahati
Dr. B.R. Satyan, CMTI, Bangalore
Prof. S. Bhand, BITS, Goa

Prof. P. Gandhi, IIT, Mumbai
Prof. K. Rajanna, IISc, Bangalore
Prof. S. Chandra, IIT, Delhi
Prof. B.P. Ronge, SVERI, Pandharpur
Dr. M. Kulkarni, DST, New Delhi
Dr. B.D. Pant, CEERI, Pilani
Dr. V.K. Suri, BARC, Mumbai
Dr. R. Balasubramaniam, BARC, Mumbai
Dr. S.K. Deb, RRCAT, Indore
Dr. G.S. Lodha, RRCAT, Indore

Applications should be sent to:

Dr. G.S. Lodha

Director, Fifth SERC School on “New Developments in Microfabrication”
Head, X-ray Optics Section
Indus Synchrotron Utilization Division
Raja Ramanna Centre for Advanced Technology, Indore 452 013
Tel. : 0731 2442123, Fax : 0731 2442140
Email : srxrl5@gmail.com
Web: www.srxrl.com