

6. Surface and Interface Science, Including Catalysis

Japanese Coordinator:

Prof. Yasuhiro Iwasawa
Professor
The University of Tokyo

Indian Coordinator:

Prof. Milan Kumar Sanyal
Professor
Saha Institute of Nuclear Physics,
Kolkata

Surface and Interface Science, Including Catalysis

【 Coordinators 】

Japanese Coordinator	Indian Coordinator
Prof. Yasuhiro Iwasawa Professor, The University of Tokyo	Prof. Milan Kumar Sanyal Professor Saha Institute of Nuclear Physics, Kolkata

Overviews and Future Plan

【FY2002-2003 Overview】

Proposed works sharing between Indian and Japanese sides, exchange visits, and seminars in 2002 (Tokyo) and 2003(Kolkata) were planned and performed.

【FY2004-2005 Future Plan】

Proposed works sharing between Indian and Japanese sides, exchange visits, and a seminar in 2005 (Tokyo) will be planned.

【Summary】

The joint research is aimed to collaborate intensively the important topics on surfaces and interfaces for nanostructured materials which provide great potentials to guarantee sustainable human life by creating novel nanostructured materials and efficient functions on the basis of new concepts and principles. To achieve design and development of nanostructured materials demands collaboration and cooperation of scientists in different research fields, which leads to innovative sciences and technologies. Typical subjects in the joint research are focused on "Low Dimensional Magnetism in Nanostructured Organic Materials", "Nanostructures and Catalysis at Surfaces and in Nanospaces," "Devices at Semiconductor Surfaces," and "Functionalized Nanostructures and Colloids". The subjects include detailed characterization of structures and magnetic electronic states at surfaces and interfaces. Discovery of novel physical and chemical phenomena, new concepts, creation of new nanomaterials, nano-properties and mechanisms at surfaces, new surface characterization techniques for nanomaterials, new theory and simulation for nanomaterials, and so on are expected by the joint research.

The first and second JSPS-DST workshop on Surfaces and Interfaces for Nanostructured Materials were organized in Tokyo (2002) and in Kolkata (2003) to discuss intensively on the selected topics in the area of Surface and Interface Sciences including Catalysis.

Report

1. Joint Research Projects

1-1 Project 1			
Title		Surfaces and Interfaces for Nanostructured Materials	
Principal Investigator	Japan	Prof. Yasuhiro Iwasawa, Professor, The University of Tokyo	
	India	Prof. Milan Kumar Sanyal, Professor, Saha Institute of Nuclear Physics, Kolkata	
Period		From 1 April, 2003 to 31 March, 2005	
	FY2003	J to I 0m/ 0md	I to J 1m/23md
	FY2004	J to I	I to J
Objectives : Title of the Project : Low Dimensional Magnetism in Nanostructured Organic Materials Investigators: F.Komori, G.Kulkarni, Y.Iwasawa, M.Sanyal			
Accomplishment Status : (a) Preparation of molecular magnets by Langmuir-Blodgett and other techniques. The magnetic clusters were embedded in organic matrix and the size of the clusters varied from single ion to few nanometer diameter particles. We also investigated the effect of dimensionality by arranging these clusters in different ways. (b) Sample preparation and initial SPM/X-ray characterization were done in India. We also performed initial magnetization measurements down to 4K.			
Future Plan : (i) STM measurements with and without magnetic field applied along and normal to the substrate surface. (ii) DC/AC magnetization measurements of these extremely diluted magnetic systems down to millikelvin temperature. (iii) EXAFS (polarized), MCD and MOKE measurements to be carried out in low temperatures with and without high magnetic field in synchrotrons and in laboratories.			

*** Exchange Visits Undertaken**

India to Japan

No. of Project	Name & Affiliation	Research Subject	Main Host Researcher	Period
Project 1 (FY2003)	Prof. M.Mukhopadhyay Senior Research fellow, Saha Institute of Nuclear Physics	Surfaces and Interfaces for Nanostructured Materials	Prof. Fumio Komori Associate Professor,	2003/10/29~ 2003/11/20 (23 days)

2. Seminars

2-1 Seminar 1	
Title	JSPS-DST Symposium on Surfaces and Interfaces for Nanostructured Materials
Japanese Organizer	Prof. Yasuhiro Iwasawa, Professor, The University of Tokyo
Indian Organizer	Prof. Milan Kumar Sanyal, Professor, Saha Institute of Nuclear Physics, Kolkata
Period & Place	From 25 March, 2003 to 27 March, 2003 Tokyo
<p>Objectives : The first JSPS-DST workshop on Surfaces and Interfaces for Nanostructured Materials were organized in Tokyo.</p> <p>Accomplishment Status : The workshop was held in March 25 - March 27, 2003, in Tokyo Garden Palace to discuss intensively on the structures, magnetic properties, catalytic activities of nanostructured materials at surfaces.</p>	
<p>Program : <u>March 25, Tuesday</u> Opening 9:30-9:35 Opening remarks by Prof. Iwasawa (Japanese Coordinator) 9:35-9:40 Opening remarks by Prof. Sanyal (Indian Coordinator) Lectures 9:40-11:45 3lectures 11:45-13:30 <i>Lunch</i> 13:30~15:10 3lectures 15:10-15:25 <i>Coffee Break</i> 15:25~18:00 4lectures 18:00 - 20:30 (tentative) <i>Welcome Dinner</i> hosted by Mr. Tandon, Indian Embassy</p> <p><u>March 26, Wednesday</u> 9:30-10:40 2lectures 10:40-10:55 <i>Coffee Break</i> 10:55-12:05 2lectures 12:05-13:30 <i>Lunch</i> 13:30-14:40 2lectures 14:40-14:55 <i>Coffee Break</i> 14:55-16:25 3lectures</p> <p><u>March 27, Wednesday</u> 9:30-10:40 2lectures 10:40-10:55 <i>Coffee Break</i> 10:55-12:05 2lectures 12:05-13:30 <i>Lunch</i> 13:30-14:40 2lectures 14:40-14:55 <i>Coffee Break</i> 14:55-15:25 1lecture 15:25-16:25 Future Plan for JSPS-DST Program 16:25-16:30 Closing Remarks</p>	

List of Participants :

From Japan

Yasuhiro Iwasawa	Professor, Graduate School of Science, The University of Tokyo
Atsushi Tsukada	Professor, Graduate School of Science, The University of Tokyo
Chuhei Oshima	Professor, Faculty of Science and Engineering, Waseda University
Toshio Ogino	Professor, Faculty of Engineering, Yokohama National University
Yasuaki Okamoto	Professor, Interdisciplinary Faculty of Science and Engineering, Shimane University
Toshihiro Yamase	Professor, Chemical Resources Laboratory, Tokyo Institute of Technology
Kiyotaka Asakura	Professor, Catalysis Research Center, Hokkaido University
Masaru Ichikawa	Professor, Catalysis Research Center, Hokkaido University
Junichiro Mizuki	Deputy Head, Japan Atomic Energy Research Institute
Toshiaki Ohta	Professor, Graduate School of Science, The University of Tokyo
Atsushi Fujimori	Professor, Graduate School of Frontier Sciences, The University of Tokyo
Toyoko Imae	Professor, Research Center for Materials Science, Nagoya University

From India

Milan Kumar Sanyal	Professor, Surface Physics Division, Saha Institute of Nuclear Physics,
Asit Baran Mandal	Professor, Physical and Inorganic Chemistry Division, Central Leather Research Institute, Chennai
Boyapati Manoranjan Choudary	Deputy Director, Indian Institute of Chemical Technology, Hyderabad
Pradeep Thalappil	Associate Professor, Indian Institute of Technology, Chennai
Ashutosh Sharma	Professor, Indian Institute of Technology, Kanpur
Kalobaran Maiti	Scientist E, Tata Institute of Fundamental Research, Mumbai
Giridhar Kulkarni	Associate Professor, Jawaharlal Nehru Centre for Advanced Scientific Research
Diptiman Sen	Associate Professor, Indian Institute of Science, Bangalore

2-2 Seminar 2	
Title	JSPS-DST Symposium on Surfaces and Interfaces for Nanostructured Materials
Japanese Organizer	Prof. Yasuhiro Iwasawa, Professor, The University of Tokyo
Indian Organizer	Prof. Milan Kumar Sanyal, Professor, Saha Institute of Nuclear Physics, Kolkata
Period & Place	From 18 December, 2003 to 23 December, 2003 India
<p>Objectives : The second JSPS-DST workshop on Surfaces and Interfaces for Nanostructured Materials were organized in Kolkata.</p> <p>Accomplishment Status : The workshop was held in December 22 – December 23, 2003, in Saha Institute of Nuclear Physics to discuss intensively on the structures, magnetic properties, catalytic activities, and other chemical functions of nanostructured materials at surfaces.</p>	
<p>Program : December 22 (Monday) Opening 10:00-10:15 Opening remarks by Prof. Bikash Sinha, Director, SINP Lectures 10:15-11:15 2 Lectures 11:15-11:30 <i>Tea Break</i> 11:30-13:00 3 Lectures 13:00-14:00 <i>Lunch</i> 14:00~15:30 Laboratory Visit 15:30-16:15 2 Lectures 16:15-16:30 <i>Tea Break</i> 16:30-18:00 3 Lectures</p> <p>December 23 (Tuesday) Lectures 10:00-11:00 2 Lectures 11:00-11:15 <i>Tea Break</i> 11:15-13:00 4 Lectures 13:00-14:30 <i>Lunch</i> 14:30~15:30 2 Lectures 15:30-15:45 <i>Tea Break</i> 15:45-17:15 3 Lectures 17:15-17:30 Closing Remarks by Prof. Milan Sanyal, Prof. Yasuhiro Iwasawa</p>	
<p>List of Participants : From Japan Yasuhiro Iwasawa Professor, Graduate School of Science, The University of Tokyo Atsushi Tsukada Professor, Graduate School of Science, The University of Tokyo Chuhei Oshima Professor, Faculty of Science and Engineering, Waseda University Toshio Ogino Professor, Faculty of Engineering, Yokohama National University</p>	

Yasuaki Okamoto	Professor, Interdisciplinary Faculty of Science and Engineering, Shimane University
Kiyotaka Asakura	Professor, Catalysis Research Center, Hokkaido University
Masaru Ichikawa	Professor, Catalysis Research Center, Hokkaido University
Toshiaki Ohta	Professor, Graduate School of Science, The University of Tokyo
Atsushi Fujimori	Professor, Graduate School of Frontier Sciences, The University of Tokyo
Toyoko Imae	Professor, Research Center for Materials Science, Nagoya University
Fumio Komori	Associate Professor, Institute of Solid State Physics, The University of Tokyo
From India	
Milan Kumar Sanyal	Professor, Surface Physics Division, Saha Institute of Nuclear Physics,
Asit Baran Mandal	Professor, Physical and Inorganic Chemistry Division, Central Leather Research Institute, Chennai
Pradeep Thalappil	Associate Professor, Indian Institute of Technology, Chennai
Ashutosh Sharma	Professor, Indian Institute of Technology, Kanpur
Kalobaran Maiti	Scientist E, Tata Institute of Fundamental Research, Mumbai
Giridhar Kulkarni	Associate Professor, Jawaharlal Nehru Centre for Advanced Scientific Research
D.Ghose	Professor, Saha Institute of Nuclear Physics
M.Mukhopadhyay	Senior Research Fellow, Saha Institute of Nuclear Physics
Alkmoy Datta	Professor, Saha Institute of Nuclear Physics
Swapan K.Pati	Jawaharlal Nehru Centre for Advanced Scientific Research
Badal C.Khanra	Saha Institute of Nuclear Physics
M.Mukherjee	Saha Institute of Nuclear Physics

3. Visiting Scientists for Information Exchange

India to Japan

Name & Affiliation	Research Subject	Main Host Researcher	Period
Prof. N. Viswanadham Scientist, Indian Institute of Petroleum	Nanostructures and Catalysis at Surfaces and in Nanospaces	Prof. Yasuhiro Iwasawa, Professor, The University of Tokyo	2003//2/15~ 2003/3/31 (21 days)
Prof. M. Sanyal Professor, Saha Institute of Nuclear Physics	Low Dimentional Magnetism in Nanostructured Organic Materials	Prof. Yasuhiro Iwasawa, Professor, The University of Tokyo	2003/3/23~ 2003/3/30 (8 days)
Prof. A. B. Mandal Deputy Director, Central Leather Research Institute	Nanostructures and Catalysis at Surfaces and in Nanospaces	Prof. Yasuhiro Iwasawa, Professor, The University of Tokyo	2003/3/23~ 2003/3/30 (8 days)
Prof. B. M. Choudary Deputy Director, Indian Institute of Chemical Technology	Nanostructures and Catalysis at Surfaces and in Nanospaces	Prof. Yasuhiro Iwasawa, Professor, The University of Tokyo	2003/3/23~ 2003/3/30 (8 days)
Prof. T. Paradeep Associate Professor, Indian Institute of Technology, Madras	Nanostructures and Catalysis at Surfaces and in Nanospaces	Prof. Atsushi Tsukada, Professor, Graduate School of Science, The University of Tokyo	2003/3/23~ 2003/3/30 (8 days)
Prof. A. Sharma Professor, Indian Institute of Technology, Kanpur	Nanostructures and Catalysis at Surfaces and in Nanospaces	Prof. Toshihiro Yamase, Professor, Chemical Resources Laboratory, Tokyo Institute of Technology	2003/3/23~ 2003/3/30 (8 days)
Prof. K. Maity Associate Professor, Tata Institute of Fundamental Research	Nanostructures and Catalysis at Surfaces and in Nanospaces	Prof. Cyuhei Oshima, Professor, Faculty of Science and Engineering, Waseda University	2003/3/23~ 2003/3/30 (8 days)
Prof. D. Sen Associate Professor, Indian Institute of Science	Nanostructures and Catalysis at Surfaces and in Nanospaces	Prof. Atsushi Tsukada, Professor, Graduate School of Science, The University of Tokyo	2003/3/23~ 2003/3/30 (8 days)
Prof. G. U. Kulkarni Associate Professor, Jawaharlal Nehru Centre for Advanced Scientific Research	Low Dimentional Magnetism in Nanostructured Organic Materials	Prof. Toshio Ogino, Professor, Faculty of Engineering, Yokohama National University	2003/3/23~ 2003/3/30 (8 days)