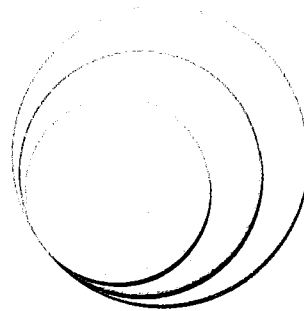


MATERIAL ADVANTAGE

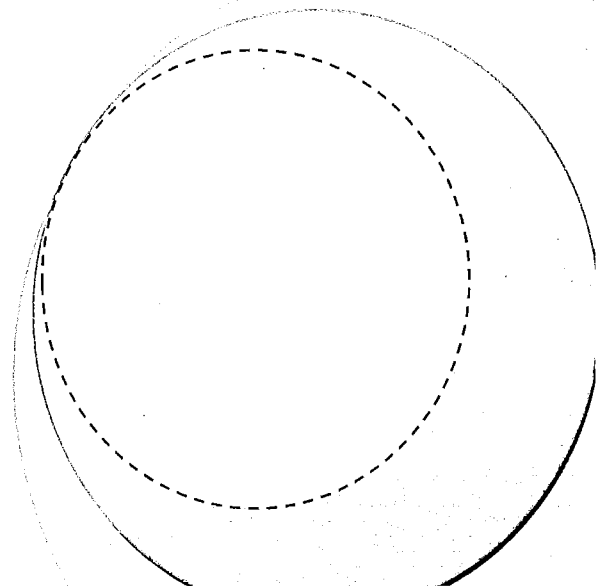
@
IIT Kanpur



FALL Membership Challenge

2009-10

**Submitted on
31st October, 2009**





Fall 2009 Membership Challenge Report

15th September to 31st October

I hereby support this chapter's report. The information contained within this report is accurate to the best of my knowledge.

Faculty Advisor: Paresh Balani Date: Oct. 31st 2009

I hereby submit this chapter's report on behalf of my chapter. This information contained within this report is accurate to the best of my knowledge.

Submitted by: Samir Mandal Date: Oct. 31st 2009
(CHAIR, MA @ IIT KANPUR)

IIT Kanpur
31st October, 2009

Material Advantage @ IIT Kanpur Fall Membership Challenge Report

Membership Challenge at Material Advantage, IIT Kanpur

A whopping growth of 66.66 % (22 new student members) has been observed in the Material Advantage @ IIT Kanpur chapter during the Membership challenge pushing the total membership count from 33 to (Before Oct. 1st 2009) to a whopping 55 (Fifty Five student members) By October 31st 2009 as seen in the growth bar-chart below:

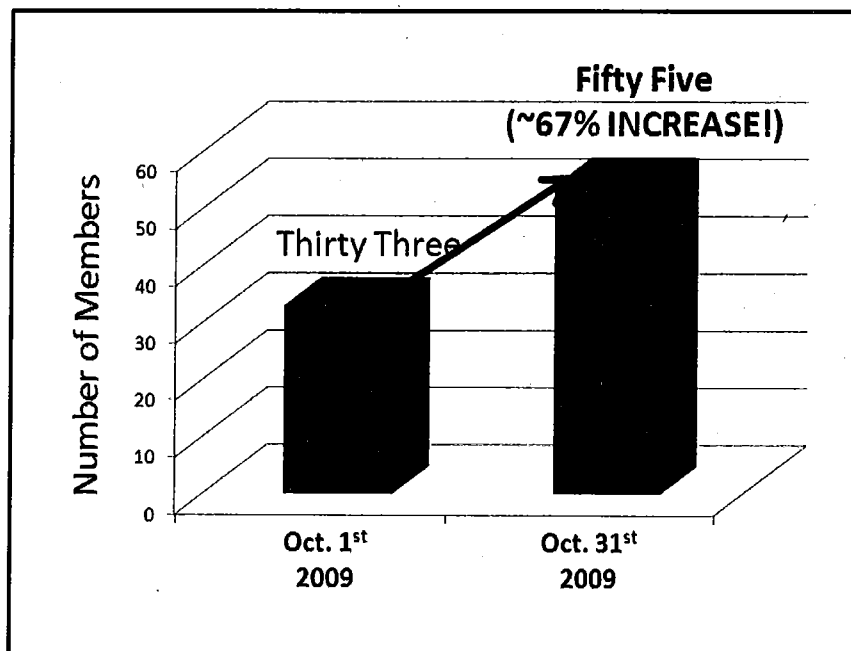


Figure 1: Bar Chart Showing membership growth during Fall Membership Challenge

Introduction of the Material Advantage @ IIT Kanpur Chapter:

The Material Advantage @ IIT Kanpur has been constituted in January 2009 by 10 students, and 5 student officers were elected in February 2009. The membership team includes both the faculty advisor and the student members alike, leading from the front were the Faculty Advisor Dr. Kantesh Balani and the new Chair Mr. Saumen Mandal substituting Ex – Chair Mr. Sairam Krishna in the month of May, and their efforts were bolstered by active support from the other members.

Our student chapter focus on two main objectives:

- 1) Through the extended network of Student Chapter to improve student member's academic ability, and open doors for our members to communicate with established professionals workings in the fields of metallurgy, materials and related disciplines.
- 2) Outreach to community to the budding Engineer, try to inspire students to become the future Scientists.

The activities undertaken by the MA@IITK for the Fall Membership Challenge are listed below and are classified as:

- 1) Meetings
- 2) Campaign Booths
- 3) Technical Events
- 4) Lecture Series
- 5) Social Activities/ Outreach Activities
- 6) Research Flier (ROCKETS)
- 7) Future Activities

1. Details Meetings of Material Advantage@ IIT Kanpur for Fall Membership Challenge:

Following meeting were arranged specifically for the Fall Membership Drive to consolidate the events (technical and social) for enhancing the membership at MA@IIT Kanpur

No.	Date	Venue	Agenda
1.	16/09/09 5-6pm	FB 421	Future Planning of MA Activities
2.	01/10/09 5-6 pm	WL204	New Membership Drive
3.	19/10/09 2-3 pm	Biomaterial Lab	Spring Challenge Report Event Drives

2. Campaign Booths:

Membership drive for new members was conducted by putting campaign booths and distributing the Material Advantage application forms to students. These were conducted on 5th October and 22nd October.

Additionally a special drive was conducted between Oct. 14-Oct. 21st during lunch-time at Hall-IV canteen to interest students in becoming member of Material Advantage.



Figure 2: Students taking participation in Membership Drive @IIT Kanpur on Oct. 5th



Figure 3: Introduction Seminar about Material Advantage@ IIT Kanpur on Oct. 22nd

3. Technical Event (Micrography Contest) on Sep. 18th

To kick start the membership drive, Micrography contest was held at IIT Kanpur on Sept. 18th 2009. Approximately **112 Students participated** in the contest and attractive prize was offered to the winners. The micrographs comprises of different images which was obtained from Optical microscope, SEM, TEM and AFM. IIT Faculty , Dr Gouthoma (MME Department), Dr. Ashok Kumar (BSBE Department) and Dr. Rajeev Gupta (Physics & MSP Department), were invited as judges for the different Engineering area.

For the first time, IIT Kanpur was hosting such micrograph event. We had received a huge response from different Engineering field and sciences.

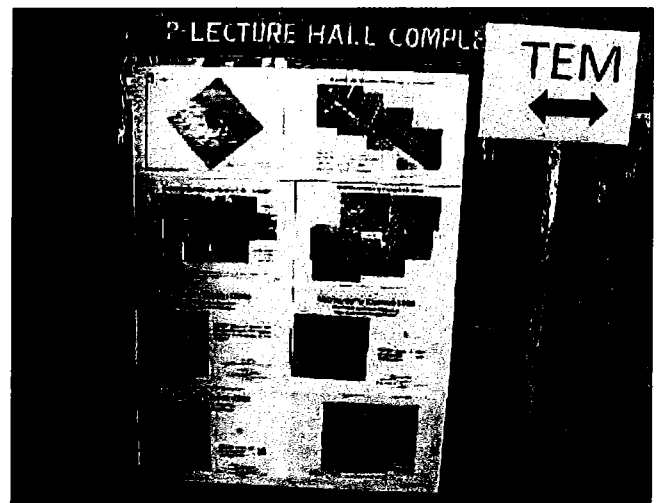




Figure 4: A few Micrograph images which was displayed at the Micrography Contest

Micrography Contest Advertisement


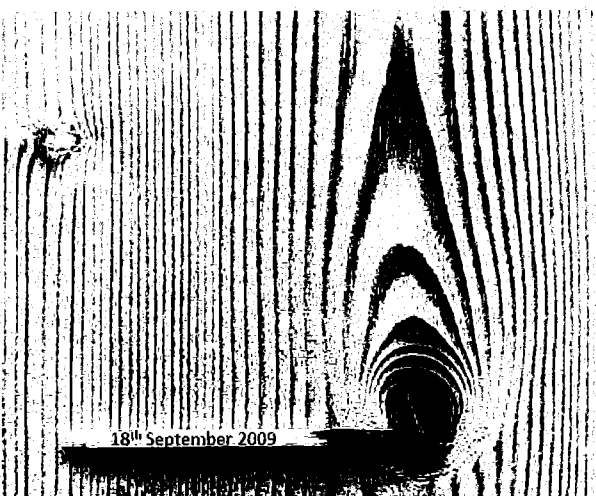


@ IIT Kanpur
Materials and Metallurgical Engineering
Indian Institute of Technology Kanpur



● Micrography Contest-2009 ●

All interested students are invited to send their Optical/ SEM /TEM / AFM images. Selected images / micrographs will be displayed. Attractive prizes and certificates to the winners and participants



Deadline for Submission: 16th September, 2009

Requirement for Participation

- Departments that can participate: MME, MSP, ME, AE, BSBE, CE, CHE, CHM & PHY
- One soft and Hard copy of micrograph on A4 size paper: Black and White or Colour micrograph having good resolution with a brief description about micrograph/ image
- Own Work (No Piracy)

Venue : New LHC Floor (beside L8) , Date: 18th Sep 2009; 3-5 PM

Micrography Contest-2009

Email: smandal@iitk.ac.in, apmoon@iitk.ac.in , kbalani@iitk.ac.in

Figure 5: Flier of the Micrography Contest



Figure 6: Inauguration ceremony of Micrography Contest by Chief Guest Prof. Dr Mazumdar, Head, MME Department, IIT Kanpur on Sept. 18th 2009.

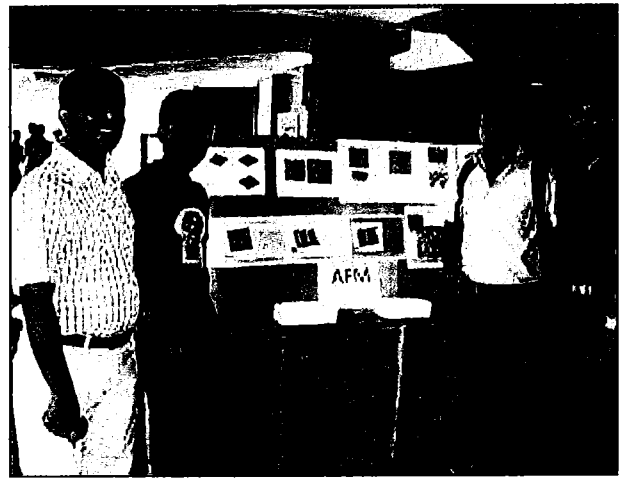
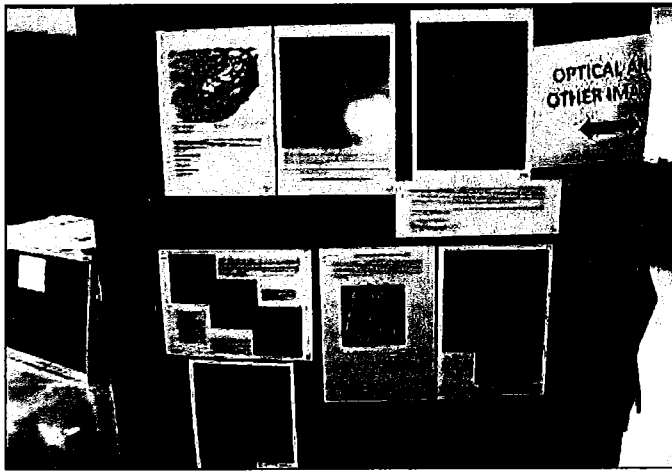


Figure 6: Visitors and students at Micrography Contest



Figure 7: Evaluations by our distinguished judges



Figure 8: Ballot Box for most popular micrograph



Figure 9: Award distribution ceremony during Micrography Contest

Details list of Award Winners of “Micrography Contest 2009”

Category (A)

- 1st Best Micrograph in SEM section: **Mr U.Raghunandan**, *Materials & Metallurgical Engineering*
- 2nd Best Micrograph in SEM section: **Mr K. Hari**, *Chemical Engineering*
- 3rd Best Micrograph in SEM section: **Mr Chadra Shekhar Sharma**, *Chemical Engineering*

Category (B)

- Best Micrograph in AFM section: **Mr Chadra Shekhar Sharma**, *Chemical Engineering*

Category (C)

- Best Micrograph in Optical/Other Microscopy Technique section: **Ms Sneh Harsh**, *Biological Science & Bioengineering*

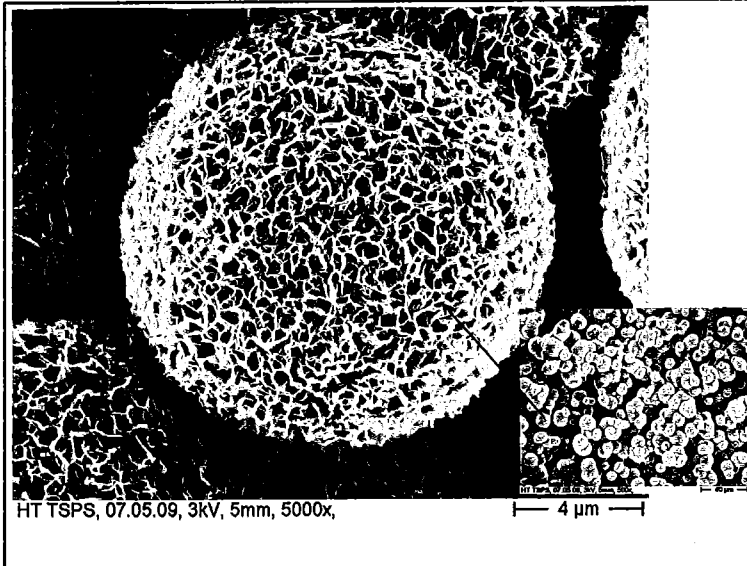
Category (D)

- Best Micrograph in TEM section: **Mr J. Bhagyaraj**, *Materials & Metallurgical Engineering*

Category (E)

- Most Popular Micrograph: **Mr Ashok Kumar**, *Material Science Program.*

Best Micrograph in SEM

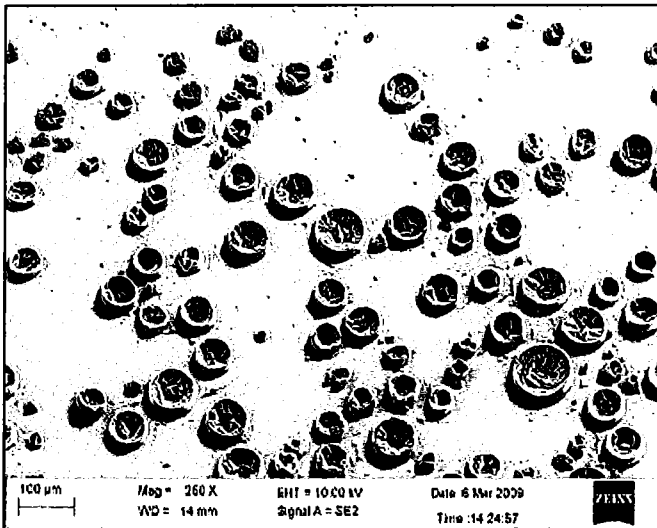
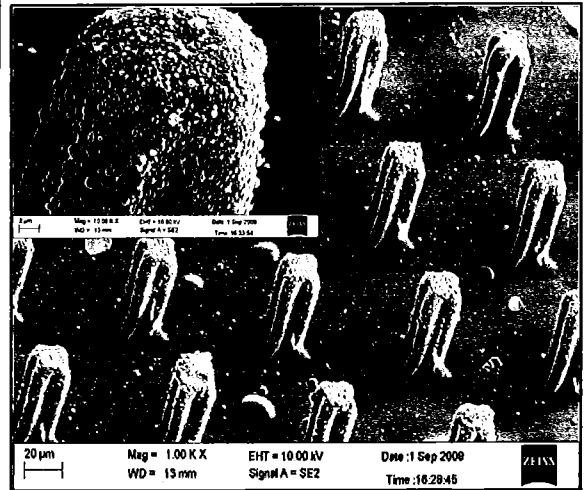


This SEM image is a novel example of integration of “Top-down” and “Bottom-up” approach for C-MEMS. Carbon posts are prepared by lithography, a “Top down” approach while c particles synthesized by sol-gel process are deposited conformally on it by electrospaying.

2nd Best Micrograph in SEM section: Mr K. Hari

Porous Hydroxyapatite Micro-spheres formed on SPS Ti-Si-C Alloy by Biomimetic Deposition

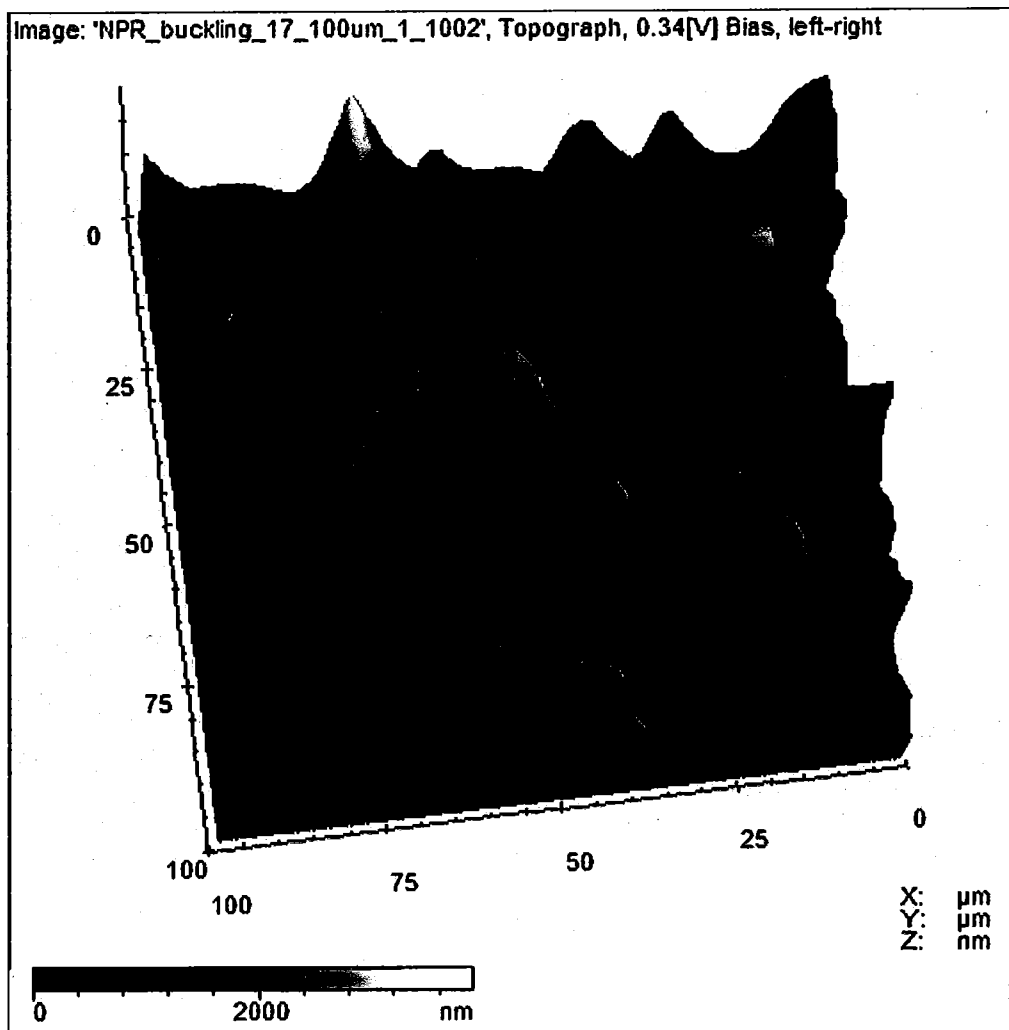
1st Best Micrograph in SEM section: **Mr U.Raghunandan**



SEM image of “high surface area carbon cup” synthesized by sol-gel polycondensation of resorcinol-formaldehyde (RF) gel followed by reverse emulsification in non-ionic surfactant, Span-80. Stirring was performed by 12-blade geometry stirrer.

3rd Best Micrograph in SEM section:
Mr Chadra Shekhar Sharma

Best Micrograph in AFM

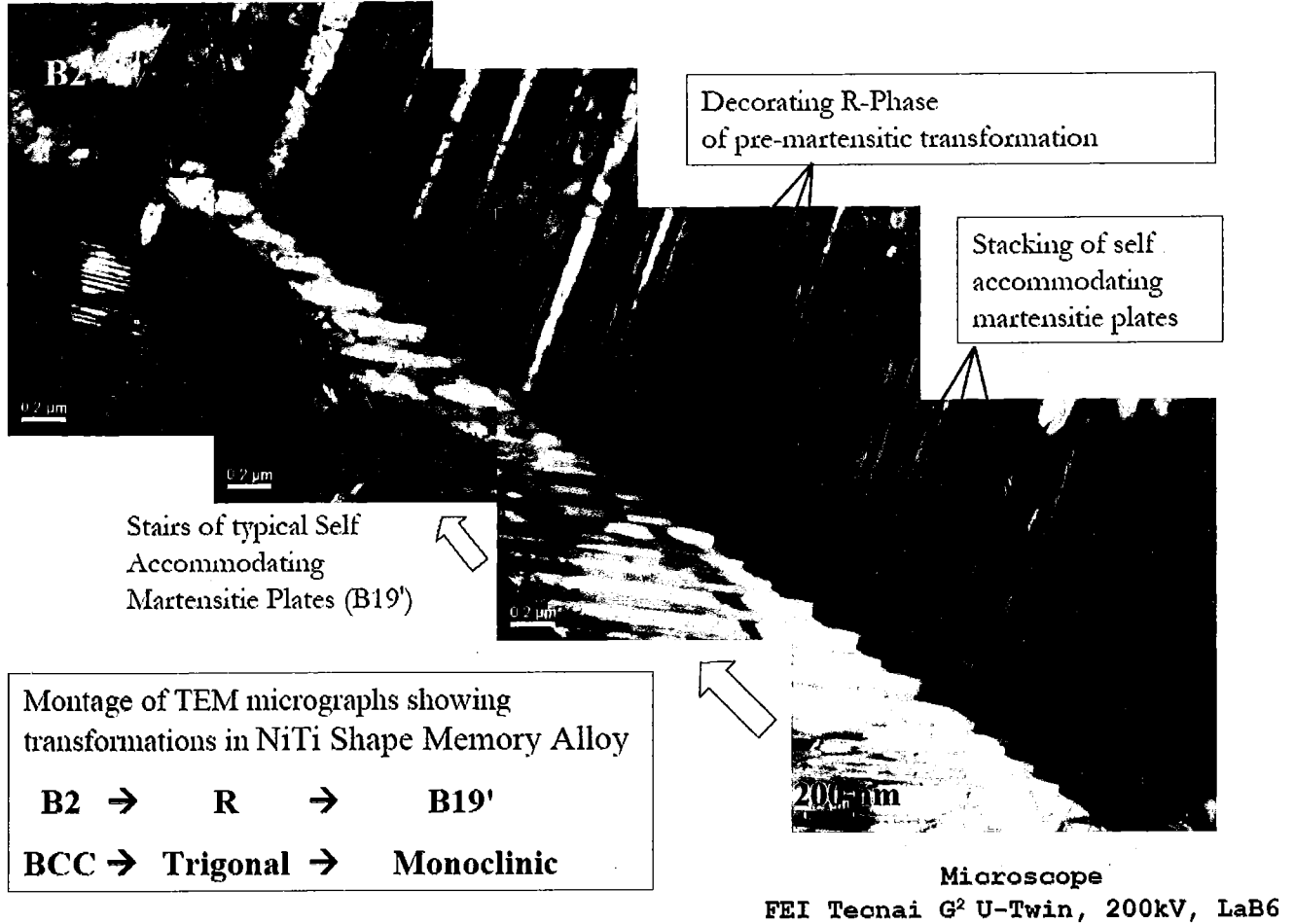


AFM image showing the buckling instability induced pattern on a uniform photoresist surface. Buckling is observed because of relative change in bulk modulus of two layers of photoresist (hard and soft) after UV exposure followed by developing the layers in a solvent.

Best Micrograph in AFM section: **Mr Chadra Shekhar Sharma**

Best Micrograph in TEM

Material with Memory - Architecture in Nano Scale



Best Micrograph in TEM section: **Mr J. Bhagyaraj**

4. Lecture Series:

4.1. Seminar by Prof. Dr. Arun Kumar Biswas

13th October 2009

Topic: IIT Kanpur Formative Years (1960-95): Some Recollections, Residents and Visitors

Abstract:

The presentation was accompanied with some visual illustrations. This lecture was emphasized more on the early social and cultural interactions rather than the academic developments, on some specially chosen residents and visitors in the IITK Campus. An attempt was made through this lecture to highlight our early socio-political awareness, musical pursuits and humble spiritual awareness. The presentation ends with an effort to define "excellence" in the broadest perspective, including the academic as well as the extra-curricular and spiritual dimensions which are achievable in IITK

About the Speaker:

Prof. Arun Kumar Biswas was born in 1934 and educated in the St. Xavier's College and University College of Science and Technology – both in Kolkata – and then in the Massachusetts Institute of Technology, USA. A specialist in Applied Chemistry, Surface Chemistry, Mineral Engineering and Metallurgy, Prof. Biswas has served the Department of MME, IIT Kanpur for 32 long years since 1963, and after retirement became Professor in the Asiatic Society, Jadavpur University and the Indian Institute of Advanced Studies, Shimla. For the last 25 years he has been working in the area of the History of Science and Civilization under the aegis of the Indian National Science Academy. He is the author of 20 books and hundreds of papers in Mineral Engineering, Archaeo-Metallurgy, History of Science and Religion and the Ramakrishna Vivekananda Movement.



Figure 10: Dr A K Biswas delivering Lecture about IIT Kanpur Formative Years

4.2. Seminar by Dr. Kantesh Balani:

20th October 2009

Title: **"What is your Colour?"**

Abstract:

This presentation on "What is Your Colour" was to bring out the colour that defines you! Often individuals follow certain traits and behaviours associated with a common set of hidden values and character. We keep changing with time, and our response to environment was defined by our mood as well. A short activity during the presentation will help you identify your major traits.

About the speaker

Dr.Kantesh Balani is presently Assistant professor at the Department of Materials & Metallurgical Engineering, IIT Kanpur. He is also Faculty Advisor, Material Advantage at IIT Kanpur.

5. Social Activities

5.1. *Dandiya Night: 24th September 2009*

Our chapter also encourage some cultural festival like Dandiya Raas which is considered the traditional folk dance form of Vrindavan, India, where it is performed depicting scenes of Holi, and lila of Krishna and Radha. Along with Garba, it is the featured dance of Navratri evenings in Western India. Navratri, Navaratri, or Navarathri is an Indian festival of worship and dance.

Dandiya Night

Sept. 24th 2009



Few Winners Awarded
by Mrs. Dhande



Lost in the Rhythm of Dandiya

Figure 11: Themes of Dandiya

5.2. Money and clothes collection for Andhra Pradesh flood victims

10th October 2009

Material Advantage IIT Kanpur chapter came forward actively to **help the flood victims**. The chapter was successfully able to recollect Rs 20000 (INR) and two full boxes of clothes which were send to the Andhra Pradesh Government fund.

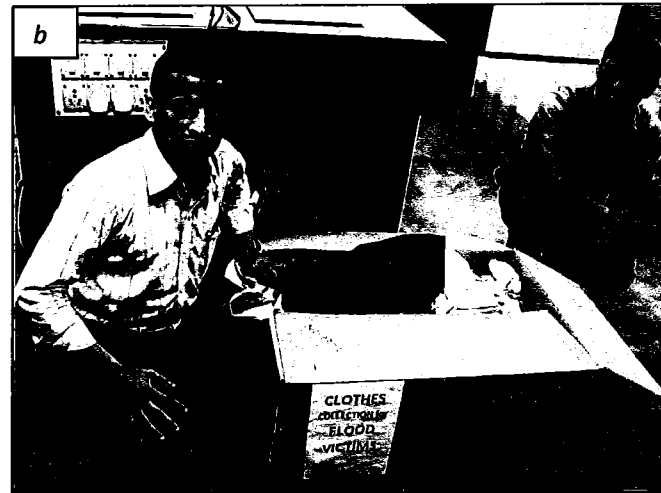



Figure 13: a) AP Floods 2009 in Kurnool, Krishna, Mahaboobnagar, Guntur, Nalgonda Districts (India) (Courtesy: 5th October, India Daily

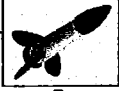
<http://www.indiadaily.in/2009/10/05/floods-hit-andhra-pradesh-and-karnataka/>)

b) Cloth Collection Drive by Material Advantage @ IIT Kanpur

6. Launching ROcKETS (Research Newsletter):

Material Advantage Chapter at Indian Institute of Technology Kanpur launched its issue of monthly research newsletter titled ROcKETS (Research Overcoming Challenges in Engineering, Technology and Sciences). This step had been instrumental in providing a platform for the students of IIT Kanpur to showcase their creativity, and get updated with current research events as well.






MA@IIT Kanpur ...where advantage is beyond materials!

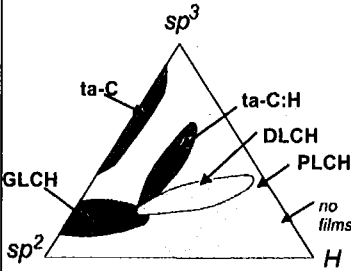
ROcKETS

Research Overcoming Challenges in Engineering Technology and Sciences



Diamond-Like Carbon (DLC)

DLC is a metastable amorphous form of carbon, unlike diamond and graphite, with both sp^3 (predominant) and sp^2 (small fraction) bonds. This results in a form of Carbon that has properties intermediate to diamond and Graphite. It was first produced in 1969 by Aisenberg and Chabot [1].



Ternary Phase Diagram of Diamond (sp^3), Graphite (sp^2) and Hydrogen.

Important Classes of DLC:

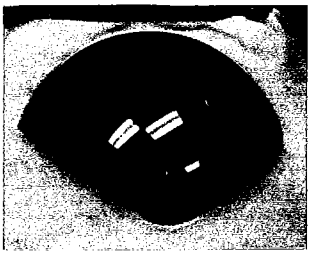
ta-C (tetrahedral a-C): The amorphous carbon aggregate containing more than 85% of the bonds as sp^3 . "Extremely Hard"

a-C: Amorphous Carbon containing less that 85% of sp^3 configuration. "Softer than ta-C"

a-c:H (Hydrogenated a-C): Amorphous Carbon with a few carbon atoms replaced with hydrogen. "Hard and Smooth"

Attractive Properties:

- Coefficient of Friction as low as 0.01-0.3 (less than that of Teflon and MoS_2)
- High hardness varying between 2000-9000 HV and excellent wear resistance
- Good thermal conductivity and high electrical resistivity
- Excellent lubricating properties with its nano-level smoothness and freedom from pinholes.



Date: Oct 30th 2009

Contributed by: U. Raghunandan, M. Tech., MME

References: [1] Pierson, Handbook of Carbon, Diamond, Graphite and Fullerenes

Figure 14: Research Newsletter Rockets launched by MA @ IIT Kanpur

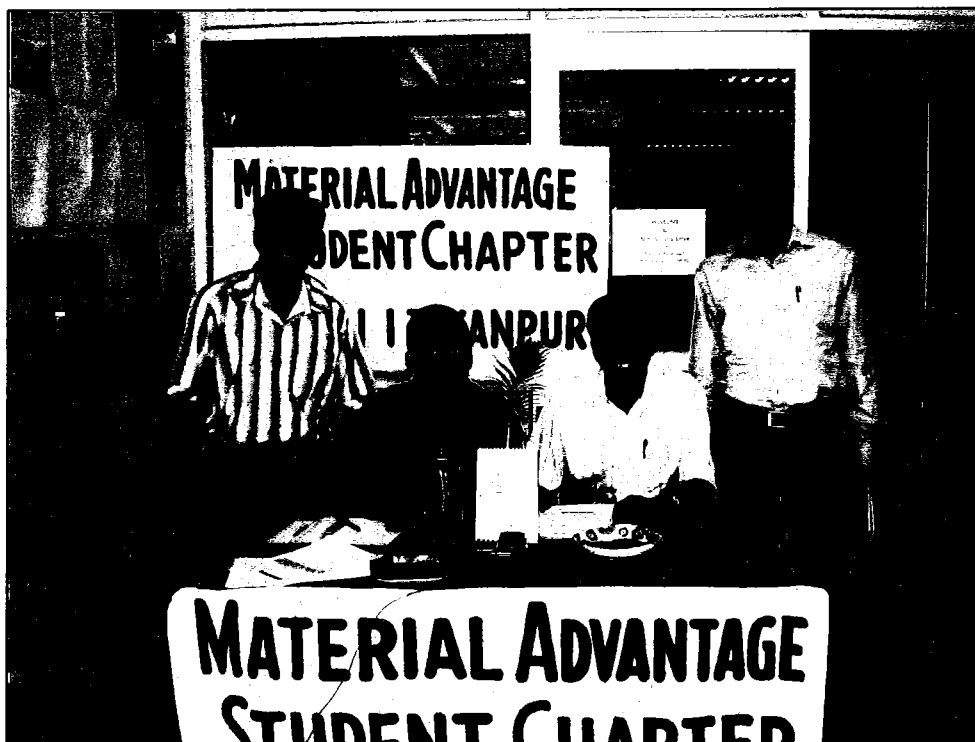
7. Future Activities:

1. MA@IIT Kanpur is going to launch student chapter website soon. This will keep update on Material advantage student put event current activities, and further upcoming activates plan on it (tentatively on Nov. 14th 2009).
2. Material Advantage student chapter T- shirt will also be dispersed to student members during the launch of website.
3. The Chapter will also going to arrange a special guest lecture in December 2009.
4. A "Treasure hunt" based on Metallurgical clues is being planned in December 2009.
5. Material Advantage Quiz would be organized in Jan. 2010 to create awareness among students about aspects of materials science that sound trivial but are critical to the understanding of materials science

Students taking participation in Material Advantage membership drive, with the active participation from the members, able guidance of the faculty advisor and whole hearted efforts of the chapter officers, we have reached thus far and we look forward to reach greater heights in the future.

Office Members Student Chapter @ IIT Kanpur

1. **Faculty Advisor:** *Dr Kantesh Balani*
2. **Chairman:** *Mr. Saumen Mandal*
3. **Vice Chairman:** *Mr. A.P. Moon*
4. **Secretary:** *Mr. Vinod Kumar*
5. **Treasurer:** *Mr. P. Sivagnanapalani*



MATERIAL ADVANTAGE STUDENT CHAPTER

@

Indian Institute of Technology Kanpur
