

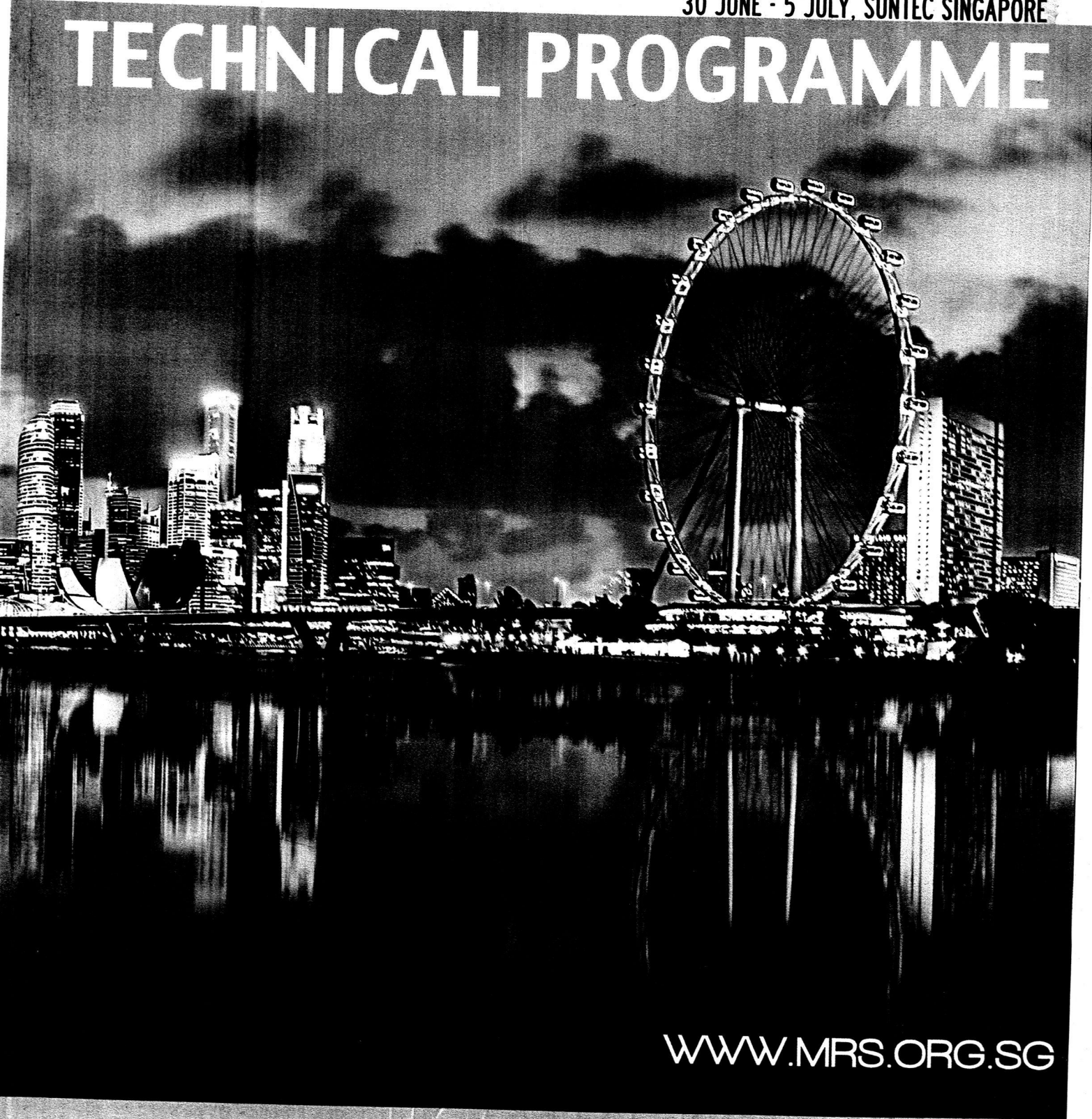
# ICMAT 2013

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7TH INTERNATIONAL CONFERENCE ON  
MATERIALS FOR ADVANCED TECHNOLOGIES

30 JUNE - 5 JULY, SUNTEC SINGAPORE

## TECHNICAL PROGRAMME

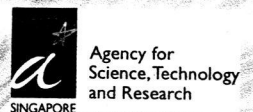
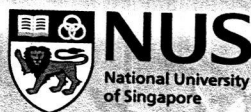


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## Symposium P Poster Session

Tue - 2 Jul 13 | 08:30 - 16:30 | Hall 403 @ Level 4

- Sn. 1 P-PO1-1  
**Synthesis and Characterization of Ultrafine TiO<sub>2</sub> Nanocrystal Via an Aqueous Sol-gel Process at Room Temperature**  
Xianfeng DU<sup>1\*</sup>, Youlong XU<sup>1\*</sup>, Kai MEN<sup>1</sup>, Bing LI<sup>1</sup>, Zhuo YANG<sup>1</sup>  
<sup>1</sup>Electronic Materials Research Laboratory, Key laboratory of the Ministry of Education & International Center of Dielectric Research, Xi'an Jiaotong University, China
- Sn. 2 P-PO1-2  
**Study on Chemical State and Property Change of the Novel Calcium Phosphate Composite Material Synthesized by Wet Method**  
Yuto NOMURA<sup>1\*</sup>, Toru NONAMI<sup>1\*</sup>  
<sup>1</sup>Chukyo University, Japan
- Sn. 3 P-PO1-3  
**Carbon Doped ZnO Micro Hollow Spheres for Visible Light Responsive Photocatalyst**  
Taiki IHARA<sup>1\*</sup>, Hajime WAGATA<sup>2</sup>, Toshihiro KOGURE<sup>3</sup>, Ken-ichi KATSUMATA<sup>4</sup>, Kiyoshi OKADA<sup>4</sup>, Nobuhiro MATSUSHITA<sup>4\*</sup>  
<sup>1</sup>Department of Electronic Chemistry, Tokyo Institute of Technology, Japan, <sup>2</sup>Department of Environmental Science and Technology, Shinshu University, Japan, <sup>3</sup>Department of Earth & Planetary Science, The University of Tokyo, Japan, <sup>4</sup>Tokyo Institute of Technology, Japan
- Sn. 4 P-PO1-4  
**Supercritical CO<sub>2</sub>-based Processing of Amorphous Teflon-AF Fluoropolymers: Surfactant-free Dispersions and Superhydrophobic Films for Low-k Applications**  
Sachin KHAPLI<sup>1\*</sup>, Ramesh JAGANNATHAN<sup>1</sup>  
<sup>1</sup>Engineering Department, New York University Abu Dhabi, United Arab Emirates
- Sn. 5 P-PO1-5  
**Mesoporous Carbons Functionalization with Horseradish Peroxidase Using Supercritical Carbon Dioxide: Optimization and Comparison with Conventional Approach**  
Akshay JAIN<sup>1</sup>, VERONICA<sup>1\*</sup>, Rajasekhar BALASUBRAMANIAN<sup>2</sup>, Sundaramurthy JAYARAMAN<sup>1</sup>, M P SRINIVASAN<sup>1\*</sup>  
<sup>1</sup>Department of Chemical & Biomolecular Engineering, National University of Singapore, Singapore, <sup>2</sup>Civil and Environmental Engineering, National University of Singapore, Singapore
- Sn. 6 P-PO1-6  
**Sequences-selective Binding of Oligonucleotides to Superparamagnetic Nanoparticles: Fabrication of Functional Bionanostructures**  
Alexandra PERSHINA<sup>1\*</sup>, Anna MAGAEVA<sup>2</sup>, Alexey SAZONOV<sup>1</sup>  
<sup>1</sup>Central Research Laboratory, Siberian State Medical University, Russian Federation, <sup>2</sup>Department for Structural Macrokineics, Tomsk Scientific Centre, Russian Federation
- Sn. 7 P-PO1-7  
**Antimicrobial Response of Ag- and Zr-based Thin Film Metallic Glasses**  
Y. Y. CHU<sup>1\*</sup>, T. Y. WU<sup>1</sup>, Jacob HUANG<sup>2\*</sup>  
<sup>1</sup>MSE, National Sun Yat-Sen University, Taiwan, <sup>2</sup>MSE, National Sun Yat Sen University, Taiwan
- Sn. 8 P-PO1-8  
**A Facile Route to Synthesis Hydroxyapatite - Zirconia Nanocomposite and Their Antibacterial Activity**  
I REETA MARY<sup>1,2\*</sup>, D MANGALARAJ<sup>1</sup>, C VISWANATHAN<sup>1</sup>, N PONPANDIAN<sup>1\*</sup>  
<sup>1</sup>Nanoscience and Technology, Bharathiar University, India, <sup>2</sup>Physics, Government Arts College, Coimbatore, India
- Sn. 9 P-PO1-9  
**Phthalocyanine Based Self-assembled Nanowires for Room Temperature ppb Level Cl<sub>2</sub> Sensing Application**  
Rajan SAINI<sup>1\*</sup>, Aman MAHAJAN<sup>1</sup>, R.K. BEDI<sup>1</sup>, D.K. ASWAL<sup>2</sup>  
<sup>1</sup>Physics, Guru Nanak Dev University, India, <sup>2</sup>Physics, Technical Physics and Prototype Engineering Division, Bhabha Atomic Research Center, India
- Sn. 10 P-PO1-10  
**Study of Optical and Conducting Properties of FeCl<sub>3</sub> Doped PVA Polymers**  
Thejas URS G<sup>1\*</sup>, Radhika V HURKADLI<sup>2</sup>, Niranjana M<sup>2</sup>, Basavaraj R VARDIMATH<sup>2</sup>, Manjunath A<sup>3</sup>, Somashekar R<sup>1\*</sup>  
<sup>1</sup>Physics, University of Mysore, India, <sup>2</sup>Department of Physics, Davangere University, India, <sup>3</sup>Department of Physics, Chitradurga Science College, India
- Sn. 11 P-PO1-11  
**Effect of Purity Enhancement on Surface Modification of Vein Graphite**  
Gayani AMARAWEEERA<sup>1\*</sup>, Nanda BALASOORIYA<sup>2</sup>, Athula WIJAYASINGHE<sup>1</sup>, Nishantha ATTANAYAKE<sup>3</sup>, Lakshman DISSANAYAKE<sup>1</sup>  
<sup>1</sup>Institute of Fundamental Studies, Sri Lanka, <sup>2</sup>Faculty of Applied Sciences, South Eastern University of Sri Lanka, Sri Lanka, <sup>3</sup>Faculty of Science and Technology, Uva Wellassa University of Sri Lanka, Sri Lanka
- Sn. 12 P-PO1-12  
**Polymer Nanofibers Embedded with Eu(3+) Doped ZnO Nanocrystals**  
Subhash KONDAWAR<sup>1</sup>, Priyanka CHOUBEY<sup>1\*</sup>, Shikha AGRAWAL<sup>1</sup>, Pallavi PATIL<sup>1</sup>  
<sup>1</sup>Department of Physics, R.T.M Nagpur University, India
- Sn. 13 P-PO1-13  
**A Study on the Growth Rates of CdSe and CdTe Quantum Dots in a Simple Colloidal Synthesis**  
Men Shu TAN<sup>1</sup>, Min Joon HUANG<sup>1</sup>, Hannah GARDNER<sup>1\*</sup>  
<sup>1</sup>School of Engineering, Nanyang Polytechnic, Singapore
- Sn. 14 P-PO1-14  
**Urease Biosensor Based on Polypyrrole/MWCNT Nanocomposite Films for Detection of Heavy Metal Ions in Water**  
Bhavna MESHARAM<sup>1\*</sup>, Subhash KONDAWAR<sup>1</sup>, Ritu MAHORE<sup>1</sup>, Ashish MAHAJAN<sup>1</sup>  
<sup>1</sup>Department of Physics, R.T.M Nagpur University, India
- Sn. 15 P-PO1-15  
**Growth Mechanism of Single-crystalline CeO<sub>2</sub> Nanocrystals Revealed by Electron Tomography**  
Ming LIN<sup>1\*</sup>  
<sup>1</sup>Institute of Materials Research and Engineering, Agency for Science, Technology and Research (A\*STAR), Singapore
- Sn. 16 P-PO1-16  
**Band Structure Modification in Cobalt Doped Diluted Magnetic Semiconductor (DMS) Nanoparticles Synthesised by a Non Alkoxide Base Sol Gel Process**  
Akhila C A<sup>1\*</sup>, Resmi Augustine C<sup>1</sup>, Swapna S NAIR<sup>2\*</sup>  
<sup>1</sup>Central University of Kerala, India, <sup>2</sup>Department of Physics, Central University of Kerala, India

## Effect of Purity Enhancement on Surface Modification of Vein Graphite

Gayani Amaraweera<sup>1,3</sup>, Nanda Balasooriya<sup>2</sup>, Athula Wijayasinghe<sup>1</sup>, Nishantha Attanayake<sup>3</sup>,  
Lakshman Dissanayake<sup>1</sup>

<sup>1</sup>*Institute of Fundamental Studies, Sri Lanka*, <sup>2</sup>*Faculty of Applied Sciences*

<sup>2</sup>*South Eastern University of Sri Lanka, Sri Lanka*

<sup>3</sup>*Faculty of Science and Technology, Uva Wellassa University of Sri Lanka, Sri Lanka*

Natural graphite has been identified as a cost effective source to produce anode material in rechargeable batteries, graphene and graphite oxide etc. However, impurities and the surface structure of natural graphite limit their use in above applications. Although Sri Lankan vein graphite is renowned for its high purity and crystallinity further enhancement of purity is necessary before it is used for such advanced applications. Present work investigates the effect of acid leaching on the enhancement of purity and surface modification of Sri Lankan vein graphite. Different morphological types of vein graphite were treated with 5-20 vol. % HCl at 60 -65 °C for 75 minutes. Graphite with 98.50 to 99.80 % of initial carbon content can be upgraded into 99.5 to 99.99 % of carbon by successful removal of impurities present in sulfide and carbonate forms. Since this method utilizes acids with low concentrations at low temperatures depending on the initial impurity content, it can be considered as relatively cost effective compared to the existing methods.

Surface modification of purified graphite was done by thermal and chemical oxidation. Thermal oxidation was performed at 550 °C in box furnace under air for 6 hours. For chemical oxidation, graphite was treated with strong oxidative agents, 69% HNO<sub>3</sub>, 0.1 M (NH<sub>4</sub>)<sub>2</sub>S<sub>2</sub>O<sub>8</sub> and 37% H<sub>2</sub>O<sub>2</sub> at 60 °C for 24 hours. Fourier transform infrared (FTIR) spectra of graphite after thermal and chemical oxidation showed absorption peaks corresponding to  $\nu_{C=O}$  stretching around 1740 – 1680 cm<sup>-1</sup> and  $\nu_{C-O}$  stretching around 1200 -1000 cm<sup>-1</sup> regions, indicating surface oxidation. It also indicates that the chemical oxidation effectively oxidized the purified graphite surface compared to thermal oxidation. Therefore we propose that the tested purification method together with chemical oxidation can be used as a cost effective approach to enhance the properties of vein graphite for advanced applications.