
Editorial

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Biographical notes: Mu-Chun Wang received his BS degree at the National Chung-Tung University in Taiwan in 1986 and his Master and PhD in Electrical Engineering from the Texas A&M University in 1992 and 1995, respectively. He is presently a Full Professor of Electronic Engineering at Minghsin University of Science and Technology (MUST), Hsinchu, Taiwan and the Director of the Chip Research Center of MUST. Prior to joining MUST's Faculty in 1995, he was employed by Vanguard International Semiconductor Corporation (VIS) as a Senior Device Engineer and United Microelectronics Corporation (UMC) as a Semiconductor Device Manager. He has already published over 320 journal and conference papers, obtained over 52 USA or Taiwan patents. His current interests involve micro/nano semiconductor device and process, package, reliability, ESD/latchup, RF circuit design, TFT display, and fibre-optic sensors.

Xiaofeng Zhao received his PhD at the Heilongjiang University in 2008. Currently, he works in the Department of Electronics and Engineering of Heilongjiang University, Harbin, China as a Professor, Master Supervisor and Young Academic Backbone Teacher of Heilongjiang Province. He is interested in nanomaterials and nanodevices, sensor and micro electromechanical systems (MEMS). He is in charge of the project of National Natural Science Foundation of China and has published more than 20 research papers which are included in SCI, EI and so on.

Nanoscience is the engineering of functional systems at the molecular scale, and has become an emerging and rapidly expanding discipline in the past decade. Nanocomposite materials are a hot research topic in the nanoscience domain at present. Active research areas include ceramic-matrix nanocomposites, metal-matrix nanocomposites and polymer-matrix nanocomposites. This special issue mainly focuses on the synthesis, characterisation and applications of nanocomposite materials. Finally, 12 papers were selected for publication after a rigorous review process, which covers carbon nanotubes and nanocomposites, nanocomposite films, mechanical behaviour of nanocomposites, nanocomposites for renewable energy and surface engineering of nanocomposites.

'Nd co-doping effect on optical properties of ZnO: Al nanoparticles' by H-Y. He, has quantitatively studied the Al nanoparticles by a sol-gel route. Optimal molar ratio of Nd/Al and the molar ratio of Nd/Al are introduced. The average particle size and light range are also researched.

'An efficient model for the prediction of polymerisation efficiency of nano-composite film using Gaussian processes and Pearson VII universal kernel', by Jingying Zhao and Min Han, has researched polymerisation efficiency of nano-composite. A modelling method is discussed which analyses the polymerisation efficiency of nano-composite film. For prediction of polymerisation efficiency of nano-composite film, an new algorithm combined with Gaussian processes and Pearson VII universal kernel is used. The best model that is the GP-PUK is gained.

'Modelling and optimisation of the post-weld heat treatment of γ' precipitation and hardness on Inconel X-750 using the response surface methodology', by Prachya Peasura and Bovornchok Poopat, proposes a post-weld heat treatment for Inconel X-750. The application of the response surface methodology and Box-Behnken design have been researched. The proposed mathematical model of the γ' precipitation size and γ' hardness have been investigated by experimental results.

'Investigation of microstructural and mechanical properties of Al-Al₂O₃ nanocomposite fabricated by accumulative roll bonding process', by Mansour Razavi, proposes alumina sheets and ultrafine alumina powder applying accumulative roll bonding process alumina sheets and ultrafine alumina powder have been introduced. The microstructure of the applied layer has been examined. The crystallographic phase structure and the particle size have been determined.

'Electromechanical response of polycarbonate-CNT/PZT laminates subjected to cyclic bending', by Fumio Narita, So Okura, Yasuhide Shindo and Tomo Takeda, proposes the electromechanical behaviour of piezoelectric/carbon nanotube. The three-point bending tests have been performed on the PZT/MWNT-based polycarbonate laminates and the output voltage due to cyclic mechanical loads has been measured. The nanotube content, material dimensions and loading conditions have been introduced.

'Preparation and characterisation of TiO₂ thermally modified with cyclohexane vapours', by Ewelina Kusiak-Nejman, Agnieszka Wanag, Joanna Kapica-Kozar and Antoni W. Morawski, proposes a simple method of preparation of UV-vis light-active TiO₂ photocatalysts. The new photocatalysts have been obtained by thermal modification of the anatase TiO₂ powder. Photocatalytic activity of the new photocatalysts have been investigated.

'Study on automatic detection of doped proportions of polyimide matrix inorganic nanocomposite films based on wavelet energy distribution proportion features and extreme learning machine', by Hai Guo, proposes a model for automatically detecting the doping ratio of polyimide matrix inorganic nanocomposite film. In-situ polymerisation is used to prepare nanocomposite films doped with different ratio of BaTiO₃. Experimental results indicate that the model is efficient in detecting and recognising films with different doped proportions. The predictive ability of this model is discussed.

'Experimental investigation on the compressibility of Al/Al₂O₃ nanocomposites', by Ahmed Wagih, Adel Fathy, and T.A. Sebaey, has researched the relationship between the reinforcement weight fraction and compressibility of Al/Al₂O₃ during high energy ball milling. Different analysis is used to characterise the produced powder. The compressibility behaviour is also discussed.

‘Characterisation of CNTs/TiO₂ nano composites and investigation of composite’s photo reactivity’, by Hamid Omidvar, Mohammad Sajjadnejad, K. Mirzaei, Z. Sadeghian, S. Shirazi, A. Mozafari, and A. Azadmehr, has researched Titanium dioxide (TiO₂) nanoparticles deposited onto acid treated carbon nanotubes. The photo catalytic activity of the prepared nano composites is tested. Different composites are used as catalyst to investigate the effect of CNT’s type and TiO₂/CNT mass ratio on phenol removal.

‘Mechanism of the palladium adsorption onto the pyrogallol-derived nano-resin’, by Mustafa Can, has investigated the hydroxyl groups of pyrogallol-formaldehyde resol nano resin (PGNR), while chloropalladium (II) species are reduced to Pd (0) and are oxidised during the adsorption. This type of polyphenolic polymer, PGNR is discussed in details.

‘Review of the chemical vapour deposition applications for the microelectronic devices’, by A. Salar Elahi and M. Ghoranneviss, has researched on chip and resistor housings, metal and semiconductors that are used in microelectronic devices. Ultra-thin and dense films are discussed in this paper. The effects of temperature and time and Co catalyst on the growth of nano-rods are also investigated.

‘Optimal design of process parameters, experimental fabrication and characterisation of a novel hybrid polymer nanocomposite’, by Shyh-Chour Huang and Minh-Tai Le, proposes a novel nanocomposite material that is a multiphase hybrid polymer composite with MWCNT filler. Using the Taguchi method, the optimisation parameters on tensile strength of nanocomposites have been performed. The contribution of each process parameter on the output response has been analysed. Experimental specimens have been also investigated to confirm optimum values.

We would like to take this opportunity to thank the authors for the efforts they put in the preparation of the manuscripts and for their valuable contributions. We wish to express our deepest gratitude to the reviewer for their help in selecting papers for this issue and especially the referees of the selected papers for their thorough reviews under a tight time schedule. Last, but not least, our thanks go to the editorial board of the *International Journal of Materials and Product Technology* for the exceptional effort they did throughout this process. In closing, we sincerely hope that you will enjoy reading this special issue.