



UNIVERSITI SAINS MALAYSIA



จุฬาลงกรณ์มหาวิทยาลัย
Chulalongkorn University

The 10th International Symposium in Science and Technology 2015

Collaboration between Asian Countries in Materials, Chemistry, Life Science,
Information Technology, Electric and Civil Engineering

Organized by

Chulalongkorn University, Thailand

Kansai University, Japan

Sirindhorn International Institute of Technology, Thammasat University, Thailand

Universiti Sains Malaysia, Malaysia

Cheng Shiu University, Taiwan

August 31 – September 2, 2015

Venue : Bangkok & Pathumthani, Thailand

and adheres strongly to the substrate, and wear resistance is improved due to distribution of hard compounds in the coating. However, because fusing treatment is performed at a high temperature of 1050°C, it is concerned about physical changes like melting and thermal deformation of the substrate. Therefore, in order to perform the fusing treatment without the physical change, it is necessary to decrease the fusing temperature. From a binary phase diagram of nickel-phosphorus alloy, it is known that the solidification temperature of nickel is decreased by alloying with phosphorus. In this study, influence of addition of phosphorus on the fusing temperature of nickel-base self-fluxing alloy was investigated. As a result, the solidification temperature range of nickel-base self-fluxing alloy was decrease with phosphorus content. It was revealed that the liquidus temperature of nickel solid solution of the alloy of 3.0mass%P is decreased by about 100°C compared with the phosphorus-free alloy.

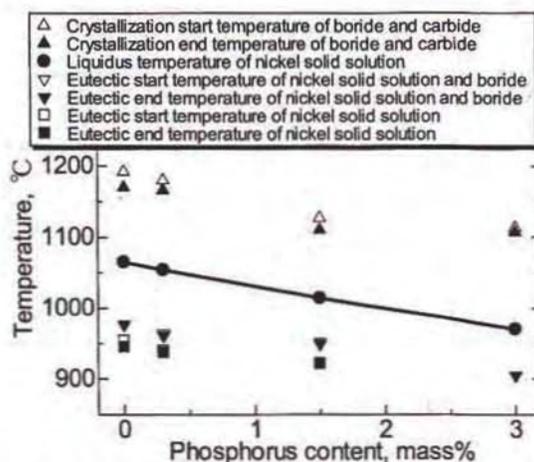


Fig.1 Relationship between each transformation temperature of nickel-base self-fluxing alloy and P content.

MC-O-10

Synthesis, Structural Investigation, and Some Applications of Nickel Doped Tin Oxide Nanoparticles

Myat Myat Thaw¹, Maung Maung Myint², Soe Myint Maung³, Kyaw Naing⁴

Lecturer, Dr, Department of Chemistry, University of Yangon

Lecturer, Dr, Department of Chemical Technology, Defence Services Science and Technology Research Centre, Pyin Oo Lwin

³ Professor, Dr, Department of Chemical Technology, Defence Services Science and Technology, Research Centre, Pyin Oo Lwin

⁴ Pro-rector, Dr, University of Yangon

In this project, tin oxide nanoparticles and nickel doped tin oxide nanoparticles were prepared from tin II chloride by using co-precipitation and hydrothermal method. By using the Debye Scherrer equation, the average crystallite size of the tin oxide nanoparticles was found to be 33.53 nm by using co precipitation method at 500 °C and 27.55 nm by using hydrothermal method. It was found that the crystal structure of tin oxide is tetragonal structure. The average crystallite size of the nickel doped tin oxide nanoparticles was found to be 19.44 (1%), 23.57nm(2%), and 33.47nm (5 %) respectively. The morphology of SnO₂ and Ni doped SnO₂

nanoparticles showed spherical shape by FE SEM. Application of tin oxide and nickel doped tin oxide nanoparticles were done for adsorption properties and antimicrobial activities in this study. Antimicrobial activity on the tin oxide and nickel doped tin oxide nanoparticles were performed against six microbial strains *Bacillus subtilis* (N.C.T.C-8236), *Staphylococcus aureus* (N.C.P.C- 6371), *Pseudomonas aeruginosa* (1679), *Bacillus pumilus* (N.C. I.B-8982), *Candida albicans*, and *E coli* (N.C.I.B-8134). It was observed that the highest antimicrobial activity of nickel doped tin oxide nanoparticles was found to be 45 mm on *E coli* strain by using agar well diffusion method. Characteristic of tin oxide and nickel doped tin oxide nanoparticles was investigated for gas sensor application by using ammonia.

Keywords : Nickel tin oxide nanoparticles, average crystallite size, adsorption, antimicrobial activity, gas sensor

MC-O-11

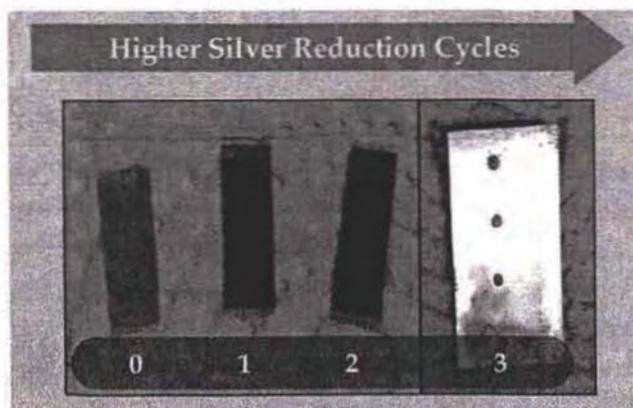
In Situ Synthesis of Metallic Nanoparticles in Polyaniline Thin Films prepared using the Layer-by-layer

Stephan Therry Dubas^a, Phatutip Tongtun^a

^aThe Petroleum and Petrochemical College, Chulalongkorn University

Polyelectrolytes multilayer thin films were prepared using the layer-by-layer deposition of anionic polyaniline (PANI) and poly (diallyl dimethyl ammonium chloride) (PDAMAC). PANI was synthesized in the presence of poly (styrene sulfonate) (PSS) which acted as a polymerization template. Silver nanoparticles were further synthesized in-situ by dipping the PEM films in a solution of silver nitrate followed by a reduction bath in sodium borohydride. The optical properties of the metallic nanoparticles embedded in the films were studied by UV-Vis spectroscopy and the electrical conductivity of the film was measured by 4 points probes. Results showed that the nanoparticles could be synthesized in the film as confirmed by the appearance of a plasmon band absorbance peak at 400nm and the conductivity of the film was improved. It was also found that successive dipping steps could lead to the metallization of the surface providing a shiny aspect. These results could be of interest for the development of flexible electrodes as well as for the electro-less plating of non-conducting plastics pieces.

Corresponding author e-mail Stephan.d@chula.ac.th



Metallization of polyaniline films by in-situ silver synthesis