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ORGANIZING COMMITTEE

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Professor Sam ZHANG
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Director, Center for Advanced Thin Films and Devices
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Southwest University, China
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Principal Research Engineer, Singapore Institute of Manufacturing Technology
WORKSHOP SCHEDULE
29/5/2019  Registration
30/5/2019  Workshop Presentations
31/5/2019  Group Discussion

VENUE
ANA Crowne Plaza Sapporo
1-2-9 Kita 3 Jonishi, Chuo Ward, Sapporo
Hokkaido 060-0003, Japan
# PROGRAM OF WORKSHOP PRESENTATIONS

**9:00 am ~ 5:00 pm, Thursday, 30 May 2019**  
KUJAKU room, L3, ANA Crowne Plaza Sapporo

## Morning session 9:00 am ~ 12:00 am  
Chair: Dr. Qi Guojun

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<td>Understanding the Adhesion Between Directly Deposited Copper Thin Film and Alumina Substrate</td>
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<td>Thin Film Piezoelectric Based Acoustofluidics: A New Platform for Lab-on-chip</td>
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<td><em>Professor Richard YongQing FU, Northumbria University, United Kingdom</em></td>
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<td>Phase Distribution and Exciton Behavior in Bulk Heterojunction Thin Films for Ternary Organic Solar Cells</td>
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<td><em>Professor Xiao-Tao HAO, Shandong University, China</em></td>
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<td>Energy Levels of Organic-organic Interfaces in the Film of Donor and Acceptor Blends</td>
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<td><em>Professor Hiroyuki YOSHIDA, Chiba University, Japan</em></td>
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<td>TiO₂ Nanotube Coatings of Superwettability for Energy and Environmental Applications: from Large-Scale Tubes to Micro Channels</td>
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<td>Samarium-doped Ceria Infiltrated Silver Nanoparticles as A Cathode for Low Temperature Solid Oxide Fuel Cells&lt;br&gt;Professor Pei-Chen SU, Nanyang Technological University, Singapore</td>
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<td>Effect of Target Poisoning on the Fabrication of Transition Metal Nitride Hard Coatings Using High Power Impulse Magnetron Sputtering&lt;br&gt;Professor Jyh-Wei LEE, Ming Chi University of Technology, Taiwan</td>
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<td>Fabrication and Biocompatibility Evaluation of ZrTiSi Thin Film Metallic Glasses&lt;br&gt;Professor Bih-Show LOU, Chang Gung University, Taiwan</td>
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<td>The Study of Growing MnO2 on the Surface of Vapor Grown Carbon Nanofibers and Carbon Fiber Cloth for Electrochemical Capacitor&lt;br&gt;Professor Wan-Yu WU, Da-Yeh University, Taiwan</td>
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ABSTRACTS
OF
INVITED TALKS
Current Status of High-Entropy Films and Coatings

Hui Li¹, Yuming Lu¹, Dong-Sing Wu², Sam ZHANG¹*

¹. Centre for Advanced Thin Films and Devices, Faculty of Materials and Energy, Southwest University
². Department of Materials Science and Engineering, National Chung Hsing University, Taiwan

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High-entropy materials draw significant attention in materials science and engineering currently due to their desirable properties. High-entropy films and coatings prepared based on HEAs or HEA ceramic by various technique also show the four core effects of HEAs: high entropy, sluggish diffusion, severe lattice distortion and cocktail effects. They are tested as protective surface coatings, diffusion barriers and even biomedical coatings. Composition design, phase structure, and the process factors are crucial for the properties of high-entropy films and coatings. Good toughness and ductility along with the hardness is also an attractive topic in this field recently. In this study, current research status of high-entropy films and coatings with kinds of coating technique and various applications were reviewed. The effect of high entropy materials’ composition and structure to their properties was discussed. With proper composition and coating process technique, HEA coating and HEA ceramic coatings with excellent properties potential for more application areas are expected.

Key words: High-entropy, HEA coatings, HEA ceramic coatings, composition design, coating process technique
Deposition and Structure Transformation of AB$_2$O$_4$ Complex Oxides: Sputtered ZnGa$_2$O$_4$ as an Example

Po-Wei Chen, Shiau-Yuan Huang, Shuo-Huang Yuan, and Dong-Sing WUU*
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Ultra-wide bandgap zinc gallium oxide (ZGO) and GO films were prepared on c-plane sapphire by conventional radio-frequency magnetron sputtering. In the current sputtered oxide studies, target composition or growth temperature is usually the main deposition variable, and the other growth conditions are fixed. This would make it difficult to fully understand the theory and characterization of ZGO films. In this study, several growth parameters as well as the post-thermal treatment were all modulated to realize and optimize the ZGO growth. From x-ray and TEM analyses, stabilization of stoichiometry and control of crystallinity transformation were confirmed to be important factors in determining the film quality. The optical bandgap of ZGO can reach 5.0-5.1 eV with a maximum responsivity peak at 240 nm. A metal-semiconductor-metal photodetector is demonstrated with a maximum responsivity over 2 A/W under a 5-V biased voltage. Furthermore, the photo/dark current ratio can be improved to be over ten thousand. As compared with those of the sputtered GO photodetector, the spectral response peak of ZGO showed a blue shift to 240 nm with higher responsivity. The data presented exhibit the ZGO material will become another potential candidate for ultra-wide bandgap semiconductor applications.

*Keywords: Complex oxide, Zinc gallium oxide, Crystal Transformation, Sputtering*
Understanding the Adhesion Between Directly Deposited Copper Thin Film and Alumina Substrate

Z. CHEN

School of Materials Science and Engineering, Nanyang Technological University, Singapore 639798

Thin film metallization on ceramic substrates is ubiquitous in the semiconductor industry. Adhesion between the deposited metal films with the substrates is critical for the device reliability. Conventionally, an adhesion layer is required between a metal film and its ceramic substrate due to the poor wettability of metal films on ceramic substrates. In this talk, I am going to present a systematic study to enhance the interfacial adhesion between directly sputtered Cu thin film and Al₂O₃ substrate without using any adhesion layer. To begin with, a number of surface pre-treatments were studied for their effectiveness on the adhesion strength between magnetron sputtered Cu thin film and polycrystalline alumina (Al₂O₃) substrate. The treatments include organic solvent cleaning, acid washing, heat treatment, plasma cleaning, and they were organized into different sequences in order to evaluate their individual contribution to the film adhesion. Adhesion strength was measured mechanically using a tensile test. By proper pre-treatment, the adhesive strength of more than 34 MPa can be achieved with direct sputtering of Cu thin film onto the Al₂O₃ substrate, which is much higher than the typically required adhesion strength of 10 MPa for electronic devices. With the help of XPS, SEM, XRD, TGA and contact angle measurement, the effect of the different surface treatment techniques can be elucidated. We then went on to quantify the effectiveness in adhesion enhancement through identifying the bonding mechanisms using both polycrystalline and monocrystalline alumina substrates with different surface roughness. Three different bonding mechanisms, viz., surface adsorption, mechanical interlocking, and diffusion bonding have been evaluated using the same tensile test described above. The contribution to the interfacial adhesion from each of the bonding mechanisms was elucidated based on the adhesion strength. Without special surface pre-treatment, physical adsorption is the main factor for the film adhesion, contributing ~5.9 MPa adhesion strength between directly sputtered Cu film and a flat Al₂O₃ substrate. For substrates with surface roughness around 350–500 nm, mechanical interlocking enhances the film adhesion by up to 18.6% compared to the flat surface. Post-deposition annealing at 300°C has increased adhesion strength by 18%, under a possible diffusion bonding mechanism. Deduced from these results, plasma treatment is able to break the surface bonding and promote adhesion through chemical bonding. This effect is far greater than the quantified physical mechanisms.

Microstructure, Mechanical and Tribological Properties of Cold Sprayed Ti6Al4V-CoCr Composite Coatings

Adrian Wei-Yee Tan1,2, Jun Yan Lek3, Wen Sun1,2, Ayan Bhowmik1,2, Iulian Marinescu1,5, Pio J. Buenconsejo4, Feng Li1,5, Zhili Dong3, Erjia LIU1,2,*

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Metal-matrix composite (MMC) coatings are advanced materials, compositing of two or more phases that can be tailored based on the industrial need such as lightweight and high wear-resistance. Cold spray (CS), as a low temperature deposition process, is highly suitable to develop MMC coatings, which does not involve particle melting, hence maintaining the original properties of each material of the composites. Ti6Al4V (Ti64) is a common material used in aerospace industry owing to its lightweight and high yield strength. Recently, CS Ti64 coatings have been developed, which show promise to repair Ti alloy components. However, there are still several pertaining issues such as relatively high porosity level and low wear-resistance. To solve these issues, CoCr particles as a reinforcing metal alloy were incorporated into a Ti64 matrix to form a composite coating through cold spraying. Pure Ti64 and CoCr coatings were also cold spray deposited for comparison. The results showed that the incorporation of the CoCr particles in the Ti64 matrix reduced porosity, increased hardness and reduced specific wear rate when compared to the pure Ti64 coatings. These properties were obtained while maintaining the original phases of the feedstock powders.
Thin Film Piezoelectric Based Acoustofluidics: A New Platform for Lab-on-chip

Richard YongQing FU
Faculty of Engineering and Environment, Northumbria University, Newcastle, UK, NE1 8ST, UK
E-mail: richard.fu@northumbria.ac.uk

This talk will focus on piezoelectric thin films including zinc oxide (ZnO) and aluminium nitride (AlN), which are used for a broad range of lab-on-chip applications such as biosensing, particle/cell concentrating, sorting/patterning, pumping, mixing, nebulisation and jetting. Integrated acoustic wave sensing/microfluidic devices have been fabricated by depositing these piezoelectric films onto a number of substrates such as silicon, ceramics, diamond, quartz, glass, and more recently also polymer, metallic foils and bendable glass/silicon for making flexible devices. Such thin film acoustic wave devices have great potentials for implementing integrated, disposable, or bendable/flexible lab-on-a-chip devices into various sensing and actuating applications. Different acoustofluidic and biosampling functions which can be generated from thin film surface acoustic wave (SAW) devices. We foresee that such microsystems are capable of performing the complete task from delivering drops of bio-sample into the device, cell/bacteria separation, manipulation, and tissue generation, through to the delivery of the detection results, using portable, wireless, flexible and remotely controlled devices.
TiO$_2$ Nanotube Coatings of Superwettability for Energy and Environmental Applications: from Large-Scale Tubes to Micro Channels

Lidong SUN
State Key Laboratory of Mechanical Transmission, School of Materials Science and Engineering, Chongqing University, Chongqing 400044, PR China.
Email: lidong.sun@cqu.edu.cn

Titanium and its alloys have been widely used in aerospace, navigation, desalination, automotive and petroleum industries. Titanium tubes and pipes are of particular interest for heat and mass transfer in heat exchangers in these fields. However, a few critical problems are currently concerned: the frictional drag at the solid/liquid interface and the fouling that lowers the heat transfer coefficient. A superhydrophobic coating developed at the inner and/or outer surface of a tube is capable of providing drag reduction, suppressing fouling formation, and producing condensation heat transfer, therefore enhances the performance of heat exchangers. Nevertheless, it remains a great challenge to fabricate such superhydrophobic coatings on tubular substrates, especially at their inner surfaces considering the partially opened geometrical configuration. This presentation introduces our efforts toward large-scale and uniform fabrication of TiO$_2$ nanotube arrays at titanium tubes (length > 1000 mm, inner diameter 1–10 mm) and foams (inner diameter 0.03–0.15 mm). A superhydrophobic coating is produced at the titanium tubes by tailoring the micro/nanostructures with a contact angle > 160° and sliding angle < 3°. A conformal coating of superhydrophilic feature is achieved within the porous network inside the titanium foams, with the water infiltration rate being enhanced by over four orders. Their applications in condensation heat transfer, drag reduction, oil-water separation, and integrated energy systems are discussed.

Keywords: TiO$_2$, Nanotube arrays, Superhydrophobic coating, Superhydrophilic coating
Phase Distribution and Exciton Behavior in Bulk Heterojunction Thin Films for Ternary Organic Solar Cells

Xiao-Tao HAO
School of Physics, Shandong University, Jinan, Shandong 250100, China

Organic photovoltaic (OPV) cells based on semiconducting polymers are very appealing because they are light-weight and flexible. Ternary bulk heterojunction is an effective strategy to achieve high efficient organic photovoltaic devices. Understanding the relationship of the complex morphology and the fundamental physical processes in the ternary system plays a key role to realize efficient electron transfer and enhance the device efficiency.

Here, we investigated the synergetic effects of phase distribution and exciton behavior in ternary organic photovoltaic systems. Various physical methods were adopted to adjust the morphology of the ternary blend films at nanoscale. Advanced synchrotron based techniques were employed to quantitatively analyze the morphology at multiple length scale. The photophysical dynamics including charge separation/transport, energy transfer and excited state characteristics were investigated on ultrafast temporal scale via the time resolved spectroscopy. We have attempted to unravel the fundamental mechanism of synergistic effect in ternary bulk-heterojunction blends for photovoltaic applications.

Keywords: Ternary organic solar cells; Phase distribution; Photophysics.
Samarium-doped Ceria Infiltrated Silver Nanoparticles as A Cathode for Low Temperature Solid Oxide Fuel Cells

Tsung-Han Lee, Chee Seng Ng, and Pei-Chen SU*
School of Mechanical and Aerospace Engineering, Nanyang Technological University, Singapore

*Email: peichensu@ntu.edu.sg

Silver is one of the choices for low temperature solid oxide fuel cells (LT-SOFCs) cathode due to the relatively low cost as compared to Pt. The price of Ag ($0.5 USD/g) is around 60 times lower than Pt ($30 USD/g) at the current date. It has been reported that the oxygen incorporation into the Ag-yttria stabilized zirconia (YSZ) interface is better than Pt-YSZ due to stronger spillover effect of Ag. The performance of Ag cathode is also comparable to or even better than that of Pt cathode in LT-SOFCs in some reported works. Due to its distinct properties of oxygen diffusivity and solubility, two possible oxygen diffusion pathways, surface and bulk paths, were proposed for the ORR process on Ag. However, the bulk path has been demonstrated as a rate-limiting process when operating at 400 to 900 °C, the ORR through surface path is faster than the bulk path. Thus, a highly porous structure with higher triple phase boundary (TPB) density and surface area is believed to facilitate oxygen incorporation at LT range.

This work presents a composite cathode for low temperature solid oxide fuel cells by infiltrating samarium-doped ceria into inkjet-printed silver nanoparticles. The addition of one simple infiltration step improved the thermal stability of silver cathode significantly. 2.5M-SDC infiltrated Ag cathode performed the lowest polarization resistance among bare inkjet-printed Ag. The charge transfer, surface exchange and gas diffusion resistances were improved due to the infiltrated SDC confine the silver nanostructure and prevent agglomeration during fuel cell operation. The long-term operation of 2.5M-SDC infiltrated Ag showed significantly higher thermal stability than bare inkjet-printed Ag at 450 °C for 60 hours.
Effect of Target Poisoning on the Fabrication of Transition Metal Nitride Hard Coatings Using High Power Impulse Magnetron Sputtering

Jyh-Wei LEE,1,2,3,*

1 Dept. of Materials Engineering, Ming Chi University of Technology, Taiwan
2 Center for Plasma and Thin Film Technologies, Ming Chi University of Technology, Taiwan
3 Dept. of Mechanical Engineering, Chang Gung University, Taiwan

Reactive sputtering of transition metal nitride coatings has been widely used in industries. The target poisoning is an important issue for reactive sputtering when a compound thin film is deposited at the target surface causing a decreased deposition rate. High power impulse magnetron sputtering (HiPIMS) technique has been developed for 20 years, which becomes an important coating power system for the surface engineering and functional coating fabrication. Reactive HiPIMS has greater challenges for selecting proper working conditions, such as duty cycle, frequency, reactive gas ratio and so on than these of non-reactive HiPIMS. The plasma monitoring and diagnostic techniques for understanding the plasma status and target poisoning ratio become very useful during the reactive HiPIMS. In this work, the plasma sampling mass spectrometer (PSM), optical emission spectroscopy (OES) and plasma emission monitoring (PEM) techniques were used to study the fabrication of transition metal nitride TiN, ZrN, and TiCrBN hard coatings by reactive HiPIMS and reactive superimposed HiPIMS-MF systems. Effects of different PEM controlled target poisoning ratios on the microstructure, chemical composition and mechanical properties of TiN, ZrN, and TiCrBN hard coatings were discussed in this work.
The amorphous thin film metallic glasses (TFMGs) have attracted lots of attention due to their unique properties. In this work, five ZrTiSi TFMGs with different Si concentrations were sputtered on the 316L stainless steel plates and Si wafer, respectively, by a hybrid bipolar high power impulse magnetron sputtering (HiPIMS) and radio frequency (RF) sputtering technique. The chemical composition of Si increased gradually from 9.6 to 34.7 at.%, respectively, as the Si target power increased from 50 to 250 W. The amorphous phase was found for each TFMG. The cross-sectional morphology changed from columnar to fine and featureless microstructure as more silicon contents were added into the thin film. Acceptable adhesion qualities, HF1 to HF 3, were obtained for all ZrTiSi thin films. The maximum hardness, 15.7 GPa, and the highest H/E value around 0.088 were achieved for TFMG containing 34.7 at.% Si. The corrosion resistance of 316L stainless steel disk can be greatly improved by the deposition of TFMGs. The lowest corrosion current density around 0.02 μA/cm², and the highest polarization resistance around 1042.1 kΩcm², were achieved for TFMG containing 31.6 at.%. All TFMGs showed better biocompatibility than that of 316L stainless steel substrate after the MG-63 cell line proliferation assay test. The hybrid HiPIMS-RF grown ZrTiSi TFMGs with adequate hardness and good biocompatibility can be used as a promising candidate to improve the surface biocompatibility of biomaterials.
The Study of Growing MnO$_2$ on the Surface of Vapor Grown Carbon Nanofibers and Carbon Fiber Cloth for Electrochemical Capacitor

Song-Huei Chen$^2$, Chia-Jung Tu$^1$, Sheng-Ting Hsu$^2$, Pin-Yo Liu$^2$, Menq-Jion Wu$^1$, Wan-Yu WU$^2$*

$^1$Department of Mechatronics Engineering, National Changhua University of Education, Taiwan
$^2$Department of Materials Science and Engineering, Da-Yeh University, Taiwan

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Manganese oxide (MnO$_2$) has attracted intensive attention and been widely used as catalysis, ion exchange, molecular adsorption, biosensor, and electrodes for lithium ion batteries and supercapacitors due to its low cost, abundance and environmental-friendliness. For supercapacitors, MnO$_2$ is the most investigated oxide for pseudocapacitors based on its high theoretical specific capacitance of 1370 Fg$^{-1}$. However, the theoretical specific capacitance of MnO$_2$ has rarely been achieved due to its poor electrical conductivity and specific surface area. Therefore, a hybrid electrode architecture which incorporates nanostructured MnO$_2$ on high-surface-area conductive carbon materials was used to improve the electrical conductivity and the specific capacitances. Many carbon materials such as activated carbon, carbon nanotubes, graphene, and carbon nanofibers have been selected as the carrier materials for MnO$_2$ to reduce the overall resistance and to enhance the utilization of the electrode. Moreover, MnO$_2$/carbon hybrid electrode materials also shows both double-layer and the pseudo-capacitance. In this study, vapor grown carbon nanofibers (VGCNF) and activated carbon fiber cloth (CFC) were used as the carbon support material. Nanostructured MnO$_2$ was directly grown on VGCNFs and CFC using a microwave-assisted hydrothermal and conventional hydrothermal methods. The materials characteristics and electrochemical properties are addressed.

Keywords: Vapor Grown Carbon Nanofibers, Carbon Fiber Cloth, MnO$_2$, Supercapacitance
Understanding Wetting and Spreading at Oil/Nanofluid/Solid Interfaces by Molecular Dynamics Simulation

Chen Qiubo, Ye Jun and ZHENG Jianwei*
Materials Science and Chemistry
Institute of High Performance Computing, A*STAR, Singapore

Nanofluids are liquids composing nanoparticles suspensions. The wetting and spreading of nanofluids on a solid surface has significant technological applications in coatings, film manufacturing, printing, food production, enhanced oil recovery and biological systems. However, the aggregation of nanoparticles is a problem in storage and in various applications. Understanding how nanoparticles affect the interfacial tension and impart disjoining pressure on three-phase contact line will be very helpful to design effective nanofluids. Here, we select silica nanoparticles with various surface functional groups as model nanoparticles, decane as oil and silica surface as model rock surface. Molecular dynamics simulation is carried out to study nanofluid and oil/nanofluid and oil/nanofluid/solid interfaces. The effect of functionalized nanoparticles on aggregation of nanoparticles, interfacial tension and disjoining pressure will be discussed.
The advantages of the approach to deposit transparent conductive films will be introduced. Then the optical and electrical properties of the ordinary TCO films, ITO, FTO and AZO will be briefly described. The details will be given on the multicomponent TCO films and ultra-thin transparent conductive films, taking the advantages of the powder targets. The multicomponent TCO films can be used to adjust the optical band gaps. The ultra-thin transparent conductive films are suitable to be used as the front window electrodes for the flexible photoelectrical devices.
Energy Levels of Organic-organic Interfaces in the Film of Donor and Acceptor Blends

Hiroyuki YOSHIDA
Chiba University, Japan

Organic-organic interface plays a central role in the operation of organic solar cells (OCSs). The energy level alignment of HOMOs between the two organic materials at the interfaces has been extensively examined for the planer junctions using ultraviolet photoelectron spectroscopy (UPS). However, in the practical OCSs, the bulk- heterojunctions are employed. Further, the energy level alignments of LUMOs as well as HOMOs are important to the behavior of electrons and holes. In this study, we performed UPS and low-energy inverse photoelectron spectroscopy (LEIPS) measurements of the films of donor and acceptor blend. From the precisely measured HOMO and LUMO levels, we determined the charge separation states of the blend films. Compared with the reported values of charge-transfer, charge-correction states, we will discuss the charge separation mechanism and energy loss processes in OCS.
The world's first Thin Films Society (TFS) was inaugurated on Singapore's National Day (9 August 2009) in Singapore. The TFS is a professional society dedicated to the art and science of thin films and coatings for their myriad applications, established explicitly for the world's thin films enthusiasts - from academic researchers to industrial practitioners, and from materials/equipment suppliers to product designers. The Society is chartered to facilitate the dissemination and exchange of new knowledge among its members as well as the mutual sharing of its collectively distributed experience. The Society has a huge international network whereby the Vice Presidents are carefully selected from countries or regions in Asia and beyond. These Vice Presidents have easy access and right channels to reach the thin films and coatings researchers in their respective countries or regions. As such, this international superhighway network guarantees fast and effective dissemination of thin films and coatings related information, equipment information, and testing and measurement information to the right people all over the world.
THINFILMS2020
July 21- July 24, 2020, Singapore

The Thin Films Society is the de facto host of the highly successful and visible International Conference on the Technological Advances in Thin Films and Surface Coatings. The biannual thin films conference series started in 2002 with about 70 participants and exponentially increased to more than 300 at ThinFilms2004, 500 at ThinFilms2006 and 800 at ThinFilms2018.

Following the success of ThinFilms conference series, ThinFilms2020 will again bring together state-of-the-art developments on all aspects related to the processing, characterization and applications of thin films and surface coatings. Registration will begin on Tuesday afternoon, 17 July 2018 and technical presentations will take place from 21-24 July 2020.

Please scan QR code to visit TFS and THINFILMS2020 website
Track Record of ThinFilms conference series and conference publications:

- **ThinFilms2020**
  July 21, 2020 - July 24, 2020
  Selected Papers: Selected papers will be published in special issues of Surface and Coatings Technology ([http://ees.elsevier.com/surfcoat/](http://ees.elsevier.com/surfcoat/))

- **ThinFilms2018**
  July 17, 2018 - July 20, 2018
  Selected Papers: Selected papers are published in special issues of Surface and Coatings Technology ([http://ees.elsevier.com/surfcoat/](http://ees.elsevier.com/surfcoat/))

- **ThinFilms2016**
  July 12, 2016 - July 15, 2016
  free download for a year from 20th May 2017)

- **ThinFilms2014**
  July 15, 2014 - July 18, 2014
  Selected Papers: TSF 584C 2015 & NNL 07 (03) 2015.

- **ThinFilms2012**
  July 14, 2012 - July 17, 2012
  Selected Papers: TSF, 544 (OCTOBER) 2013

- **ThinFilms2010**
  July 11, 2010 - July 14, 2010
  Selected Papers: TSF 519(15) 2011 & NNL 3(2) 2011

- **ThinFilms2008**
  July 14, 2008 - July 16, 2008

- **ThinFilms2006**
  December 11, 2006 - December 15, 2006
  Selected Papers: TSF, 516 (16) 2008 & JNN 8 (5) 2008

- **ThinFilms2004**
  July 13, 2004 - July 17, 2004
  Selected Papers: SCT, 198 (1-3) 2005

- **ThinFilms2002**
  August 01, 2002 - August 03, 2002
  Selected Papers: SCT, 167 (2-3) 2003