

出國報告(出國類別：出席國際會議)

2013 年國際金屬鍍膜暨薄膜材料研討會

2013 International Conference on Metallurgical coating and Thin Films

口頭報告發表論文：

Anti-fish bacterial pathogen effect of visible light responsive  $\text{Fe}_3\text{O}_4 @ \text{TiO}_2$   
nanoparticles immobilized on glass using  $\text{TiO}_2$  sol-gel

服務機關：國立屏東科技大學 熱帶農業暨國際合作系

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派赴國家：美國加州 聖地牙哥

出國期間：2013 年 4 月 28 日~5 月 6 日

報告日期：2013 年 7 月 17 日

## 摘要

本次國際會議是美國鍍膜材料學會第 40 次年會，在鍍膜基礎及應用研究上是屬國際性重要會議，今年會議在 Plenary Lecture 邀請了美國西北大學 Prof Tobin Marks 演講 Designer Materials for Unconventional Electronics，另外尚有邀請 80 個國際專家演講，以及各國學者共 400 多個口頭論文發表。同時亦有廠商展示最新儀器設備，以及訓練課程-Ionized PVD, thin film Nucleation, growth, and micro structural Evaluation；The Practice of Reactive Sputtering；Nano-mechanical Assessment of Thin Films and Coatings。會議日期 4 月 28 日~5 月 3 日會議包括七大領域：

- (A) Coating for Use at High Temperature
- (B) Hard Coating and Vapor Deposition
- (C) Fundamentals and Technology of Multifunctional Thin Film
- (D) Coating for Biomedical and Healthcare Applications
- (E) Tribiology And Mechanical Behavior Of Coating And Engineered Surfaces
- (F) New Horizons In Coatings And Thin Films
- (G) Application, Manufacturing And Equipment

本人論文發表在(E)議程。本年會雖然是材料科學年會，但是其中(D)、(E)是跨到生物領域的基礎及應用研究，合成新的材料來應用在生物領域例如：外科手術所使用的人工關節等。大會提供歡迎及惜別晚宴，各國專家學者有充分的互動機會。

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## 壹、目的

發表論及吸收最新研究知識。第 40 屆 2013 年國際金屬鍍膜及薄膜材料研討年會，於 4 月 30 日至 5 月 6 日於美國加州聖地牙哥舉行，由美國鍍膜材料學會主辦。此會議在國際材料科學領域頗具有代表性，各國專家學者藉此平台發表其最新研究成果，有面對面的互動機會，以及將來可能共同合作研究之主題。本人亦口頭發表論文。

## 貳、過程

4 月 28 日(星期日)：

下午由台灣搭機，因時差同日下午抵達美國聖地牙哥會場

4 月 29 日(星期一)：

註冊，參加 plenary session，題目：Designer materials for unconventional electronics，講者：Professor Tobin Marks，Northwestern University, USA, 內容主要強調設計新的材料以符合日新月異的電子材料需求，並指出設計的主軸及方向。接著是參加 Coatings for Biomedical and Health care applications 領域中的 Coatings for Bio-corrosion, Tribo-corrosion & Bio-tribiology 主題論文發表會。研究者發表的研究成果包括最新發展的鈦金屬合金，探討金屬薄膜與生物組織介面之間作用，沉積生物大分子在金屬表面方法的研究等，其中以牙科材料之研究為最多，又以與牙組織相容性及抗菌效果為主要，另有在環境污染之應用，而本人則是發表修飾性的奈米二氧化鈦抗魚類病原菌的效果，而又以只須可見光激發觸媒作用最為特殊，可應用在水族飼養疾病預防及水質改善。

4 月 30 日(星期二)：

參加 Surface functionalization, drug deliver & ant-microbial coating 主題的論文發表 Nan-omaterials, Nanofabrication & diagnostics 主題論文發表會議。研究成果主要是集中在如何使用物體表面功能化，功能化包括生物組織的相容性，細菌的附著強度、抗菌效果，主要仍是以太合金為主題，應用在骨關節新的合金及表面處理例如銀的加入可增加抗細菌附著力。改變表面電位差亦可促進或抑制與生物組織間的附著力。另前往儀器展覽會場參觀，廠商展出最新表面功能化儀器以及最新可商業化生產的合金及應用。

5 月 1 日(星期三)：

參加 High Power Impulse Magnetron Sputtering 領域的主題論文發表會。發表的研究成果主要是應用先進的 sputter 鍍膜在各種物體表面，例如：光學元件、金屬，並討論如何得到最佳濺鍍條件，以及精確控制薄膜厚度，同時探討各成膜的物理化學特徵。

5 月 2 日(星期四)：

參加 CVD Coatings & Technologies 主題論文發表會議及海報研究成果展。

論文研究成果主要是在如何增加燃料電池的鍍膜品質，亦是以工業規模生產為目標，在材料的選擇及改質為重點，再施以各種鍍膜技術達到抗腐蝕及降低成本目的。

5月3日(星期五)：

參加 Coating for Fuel Cells & Batteries 主題論文發表會議。此領域主要談的是如何高效利用太陽能包括吸收及儲存，由此會議得到許多應用太陽能在農業及水產養殖之方向，不同於利用生物來轉換太陽能成為生物能源。

5月4日(星期六)：準備返國

5月5日(星期日)：搭機返國

5月6日(星期一)：抵台

## 參、心得與建議

本會議主題雖然以材料及鍍膜為主，但是在生物醫學方的應用則頗為重要，尤其是在牙科材料及外科手術骨骼植入等材料。參加人數有來自各國研究單位的研發人員，共計約 500 篇論文，在此國際場合，也與來自國內清華大學，中央大學，成功大學及中山科學院等材料生醫學者交流互動，激發了應用材料科學來改善或解決農業例如保鮮、抗菌及節能等與永續農業有關的構想，例如會議中發表的成果之一是，當材料表面的氧化還原電位差降到負值時生物細胞就不容易附著，但這種現象是不利外科手術中植入人體的材料與人體之相容性，當電位差上升至正值則細胞傾向附著在表面增生。此種現象可應用在抗生物附著，例如水管內壁，過濾膜等，亦有可能應用在水族缸壁內之抗菌或藻類之附著，但在 coffee break 時與研究人員的交談中得知，在抗菌附著亦有效，但是否抗藻附著則還沒有測試，而且正在申請專利中。抗藻及抗菌附著正是我研究室的重點項目之一。因此參加具有代表性的國際會議尤其是跨領域國際會議，不但能獲得新知，亦對正在進行的研究有幫助。但是在研究成果發表前申請專利保護已成為趨勢，甚至不發表科學文章只申請專利，以延長競爭對手研發類似產品的時間。最後感謝本校屏東科技大學補助出國參加會議並發表論文。

肆、附錄

一、研討會議程

**Monday Morning, April 29, 2013**

<b>Plenary Lecture 8:00-9:45</b> <b>Room: Town &amp; Country</b>	
8:00 am	<b>Plenary Lecture Session</b>
8:20 am	<b>Professor Tobin Marks</b>
8:40 am	<b>Professor of Chemistry and Materials Science and Engineering Northwestern University</b>
9:00 am	<b>"Designer Materials for Unconventional Electronics"</b>  Please see full abstract on the Plenary Session Page
9:20 am	<b>8:00-9:45 a.m. Town and Country</b>

## Tuesday Morning, April 30, 2013

	<p><b>Exhibitors Keynote Lecture</b>  <b>11:00 a.m.-12:00 p.m.</b>  <b>Room: Town &amp; Country</b></p>	<p><b>Coatings for Use at High Temperature</b>  <b>Room: San Diego - Session A2-1</b></p> <p><b>Thermal and Environmental Barrier Coatings</b>  <b>Moderators:</b> R. Trice, Purdue University, US, D. Litton, Pratt &amp; Whitney, US, V. Maurel, Mines-ParisTech, France</p>
8:00 am	<p><b>Exhibition Keynote Session</b></p> <p style="font-size: 2em;"><b>Françoise Massines, CNRS, Perpignan, France</b></p> <p style="font-size: 1.5em;"><b>“Atmospheric Pressure Plasmas as a Solution for Inline Coatings: Status and Challenges”</b></p> <p><b>See Keynote Lecture page for abstract</b></p> <p style="font-size: 1.5em;"><b>11:00 am – 12:00 pm</b></p> <p style="font-size: 1.5em;"><b>Town &amp; Country</b></p>	<p><b>A2-1-1 Invited</b>            Columnar Thermal Barrier Coatings (TBCs) by PS-PVD, R. VASSEN, G. MAUER, S. REZANKA, Forschungszentrum Jülich GmbH, Germany</p> <p>Invited talk continued.</p>
8:20 am		<p><b>A2-1-3</b>            PS-PVD - Deposition of Thermal Barrier Coatings, M. GORAL, S. KOTOWSKI, J. SIENIAWSKI, Rzeszów University of Technology, Poland</p>
8:40 am		<p><b>A2-1-4</b>            Development of Porous TBC Systems with Enhanced Durability using TriplexPro 210 Technology, R. DORFMAN, C. DAMBRA, J. MEDRANO, D. CHEN, M. NESTLER, Sulzer Metco (US) Inc.</p>
9:00 am		<p><b>A2-1-5</b>            Investigating CeO<sub>2</sub>, TiO<sub>2</sub> Stabilized ZrO<sub>2</sub> for Application in Thermal Barrier Coatings (TBCs), C. MACAULEY, University of California, Santa Barbara, D. LIPKIN, General Electric (Global Research Center), US, C. LEVI, University of California, Santa Barbara, US</p>
9:20 am		<p><b>A2-1-6</b>            Thermal Barrier Effect of Topcoats from Sintered Micro-sized Hollow Spherical Alumina Particles, R. ROUSSEL, V. KOLARIK, M. JUEZ-LORENZO, H. FIETZEK, Fraunhofer ICT, Germany</p>
9:40 am		<p><b>A2-1-7 Invited</b>            Multilayer Thermal Barrier Coatings: Interplay among coating design, processing and properties, S. SAMPATH, Stony Brook University, G. DWIVEDI, Stony Brook University, US, V. VISHWANATHAN, Stony Brook University, Y. CHEN, Stony Brook University, US</p> <p>Invited talk continued.</p>
10:00 am		<p><b>A2-1-9</b>            Influence of Temperature on Phase Stability and Thermal Conductivity of Single- and Double-Ceramic-Layer EB-PVD TBC Top Coats consisting of 7YSZ, Gd<sub>2</sub>Zr<sub>2</sub>O<sub>7</sub> and La<sub>2</sub>Zr<sub>2</sub>O<sub>7</sub>, K. BOBZIN, N. BAGCIVAN, T. BRÖGELMANN, B. YILDIRIM, Surface Engineering Institute - RWTH Aachen University, Germany</p>
10:20 am		<p><b>A2-1-10 Invited</b>            Experimental Determination of Mode II Fracture Toughness of TBC's, B. ZHANG, S.J. LOCKYER-BRATTON, J. ELAWADY, K.J. HEMKER, Johns Hopkins University, US</p> <p>Invited talk continued.</p>
10:40 am		<p style="text-align: center;"><b>Exhibition Opens-Grand Hall</b>  <b>12:00-7:00 p.m.</b></p> <p style="text-align: center;"><b>Enjoy lunch in the Exhibition Hall,</b>  <b>compliments of Sulzer Metaplas</b></p>
11:00 am		
11:20 am		
11:40 am		
12:00 pm		



# Tuesday Morning, April 30, 2013

<p><b>Fundamentals and Technology of Multifunctional Thin Films: Towards Optoelectronic Device Applications</b>  <b>Room: Sunset - Session C2-1</b>  <b>Fundamentals of Thin Films towards Optoelectronics Devices</b>  <b>Moderators:</b> T. Terasako, Graduate School of Science and Engineering, Ehime University, Japan, J.A. Zapfen, City University of Hong Kong, Hong Kong Special Administrative Region of China</p>		<p><b>Coatings for Biomedical and Healthcare Applications</b>  <b>Room: Sunrise - Session D1-1</b>  <b>Surface Functionalization, Drug Delivery, and Anti-microbial Coatings</b>  <b>Moderators:</b> S. Rodil Posada, Universidad Nacional Autonoma de Mexico, Mexico, D. Shtansky, National University of Science and Technology "MISIS", Russian Federation</p>	
8:00 am	<p><b>C2-1-1</b>  Carrier Transport and Photoluminescence Properties of Ga-Doped ZnO Films Grown by Ion-Plating and by Atmospheric-Pressure CVD. <b>T. TERASAKO</b>, Y. OGURA, S. FUJIMOTO, Graduate School of Science and Engineering, Ehime University, Japan, H. SONG, H. MAKINO, Kochi University of Technology, Japan, M. YAGI, Kagawa National College of Technology, Japan, S. SHIRAKATA, Graduate School of Sci. and Eng., Ehime Univ., Japan, T. YAMAMOTO, Kochi University of Technology, Japan</p>	<b>D1-1-1</b>	<p>Fabrication and Characterizations of ZnO Nanorods/ Ag Nanoparticle Composite on the Electropolished Ti Substrate., <b>H. CHEN</b>, National Chi-Nan University, Taiwan, Republic of China, Y.M. YEH, S.M. LIU, WuFeng University, Taiwan, B.Y. HUANG, J.Z. CHEN, National Chi-Nan University, Taiwan, Republic of China</p>
8:20 am	<p><b>C2-1-2 Invited</b>  Materials Smart Design of Wide Bandgap ZnO: Function Core. <b>T. YAMAMOTO</b>, H. MAKINO, H. SONG, Kochi University of Technology, Japan</p>	<b>D1-1-2</b>	<p>Evaluations of Biocompatibility and Antibacterial Property: Effects of Various Coatings, T.Y. KAO, <b>J.P. CHU</b>, C.L. LI, National Taiwan University of Science and Technology (NTUST), Taiwan, Republic of China, Y.J. CHANG, National Taipei Municipal University of Education, Taiwan, Republic of China, J.-W. LEE, Ming Chi University of Technology, Taiwan, Republic of China, M.J. CHEN, S.H. CHANG, Mackay Memorial Hospital Tamsui Campus, Taiwan, Republic of China, J.C. LIN, Mackay Memorial Hospital Tamsui Campus, Taiwan, Republic of China</p>
8:40 am	Invited talk continued	<b>D1-1-3 Invited</b>	<p>Diamond-like Carbon for Articulation in Joint Replacements - Remaining Issues, <b>G. Thorwarth</b>, DePuy Synthes Companies, Switzerland, K. Thorwarth, Empa, Swiss Federal Laboratories for Materials Science and Technology, Switzerland, D. Bernoulli, A. Wyss, ETH Zürich, Switzerland, U. Mueller, Empa, Swiss Federal Laboratories for Materials Science and Technology, Switzerland, R. Spolenak, ETH Zürich, Switzerland, R. Hauert, Empa, Swiss Federal Laboratories for Materials Science and Technology, Switzerland</p>
9:00 am	<p><b>C2-1-4</b>  Electrical Properties of the ZnO Thin Films Grown on a-plane Sapphire Substrates using Catalytically Generated High-energy H<sub>2</sub>O. <b>N. YAMAGUCHI</b>, T. TAKEUCHI, E. NAGATOMI, T. KATO, Nagaoka University of Technology, Japan, H. UMEMOTO, Shizuoka University, Japan, <b>K. YASUI</b>, Nagaoka University of Technology, Japan</p>		Invited talk continued.
9:20 am	<p><b>C2-1-5</b>  PEDOT:PSS Film having High Catalytic Activity for use as a Counter Electrode in Dye-sensitized Solar Cell, <b>C.C. CHANG</b>, L.C. CHEN, D. MISHRA, J.M. TING, National Cheng Kung University, Taiwan</p>	<b>D1-1-5</b>	<p>Bacterial Adhesion and Corrosion Studies on TiO<sub>2</sub> and ZrO<sub>2</sub> Coatings, <b>R. GALICIA</b>, Instituto de Investigaciones en Materiales, Universidad Nacional Autónoma de México, Mexico, <b>P. SILVA-BERMEDEZ</b>, Instituto de Investigaciones en Materiales, Universidad Nacional Autónoma de México, México, A. ALMAGUER-FLORES, Universidad Nacional Autónoma de México, Mexico, S. RODIL, Instituto de Investigaciones en Materiales, Universidad Nacional Autónoma de México, Mexico</p>
9:40 am	<p><b>C2-1-6</b>  Formation and Characterization of CIS Thin Films by Co-sputtering Using CuSe<sub>2</sub> and InSe<sub>2</sub> Targets, <b>E. BLEZA</b>, J. JEON, W. LEE, N. KIM, Chosun University, Korea</p>	<b>D1-1-6 Invited</b>	<p>Surface Properties of Biomaterials and Their Application in Endogenous Tissue Engineering, <b>R. OLIVARES-NAVARRETE</b>, Georgia Institute of Technology, US</p>
10:00 am	<p><b>C2-1-7</b>  Optical Properties of Sputter-Deposited Germanium Oxide (GeO<sub>2</sub>) Films, <b>C. RAMANA</b>, University of Texas at El Paso, US, N. MURPHY, L. SUN, J. JONES, R. JAKUBIAK, Air Force Research Laboratory, Materials and Manufacturing Directorate, US</p>		Invited talk continued.
10:20 am	<p><b>C2-1-8</b>  Experimental and Theoretical Analysis of Solar Absorbing Mo-SiO<sub>2</sub> Cermet Coating, <b>Z. TAN</b>, J. ZHOU, Tsinghua University, China, D. HE, F. ZHOU, J. YI, Camda Institute of New Energy Technology, China</p>	<b>D1-1-8</b>	<p>Effect of Salivary Protein Adsorption in the Bacterial Adhesion on Microstructured Titanium Surfaces, <b>M. MARTÍNEZ-HERNÁNDEZ</b>, <b>A. ALMAGUER-FLORES</b>, Universidad Nacional Autónoma de México -Facultad de Odontología, Mexico</p>
10:40 am	<p><b>C2-1-9</b>  Effect of Nitrogen Incorporation on the Optical, Structural and Electrical Properties of Indium Zinc Oxide., <b>J. ORTEGA</b>, Universidad Autónoma de San Luis Potosí, Mexico, M. AGUILAR-FRUTIS, Instituto Politécnico Nacional, Mexico, C. FALCONY, Instituto Politécnico Nacional, Mexico, V. MÉNDEZ-GARCÍA, Universidad Autónoma de San Luis Potosí, Mexico, J. ARAIZA, Universidad Autónoma de Zacatecas, Mexico</p>	<b>D1-1-9</b>	<p>Cell Response to Amorphous-Crystalline TiO<sub>2</sub> Thin Films, <b>P. SILVA-BERMEDEZ</b>, Instituto de Investigaciones en Materiales, Universidad Nacional Autónoma de México, México, A. ALMAGUER-FLORES, Facultad de Odontología, Universidad Nacional Autónoma de México, Mexico, S.L. HYZY, R. OLIVARES-NAVARRETE, Georgia Institute of Technology, US, <b>S. RODIL</b>, Instituto de Investigaciones en Materiales, Universidad Nacional Autónoma de México, México</p>
11:00 am		<b>D1-1-10</b>	<p>Effect of Dielectric Properties of Ceramic Surface on its Binding with Protein in Solvent, <b>R. SABIRIANOV</b>, University of Nebraska at Omaha, US, A. RUBINSTEIN, F. NAMAVAR, University of Nebraska Medical Center, US</p>
11:20 am	<b>Exhibition Opens-Grand Hall</b>		
11:40 am	<b>12:00-7:00 p.m.</b>		
12:00 pm	<b>Enjoy lunch in the Exhibition Hall, compliments of Sulzer Metaplas</b>		

# Wednesday Morning, May 1, 2013

<b>Coatings for Use at High Temperature</b> <b>Room: San Diego - Session A2-3</b>		<b>Hard Coatings and Vapor Deposition Technology</b> <b>Room: California - Session B3-1</b>	
<b>Thermal and Environmental Barrier Coatings</b> <b>Moderators:</b> R. Trice, Purdue University, US, D. Litton, Pratt & Whitney, US, V. Maurel, Mines-ParisTech, France		<b>Deposition Technologies for Diamond Like Coatings</b> <b>Moderators:</b> K Böbel, Bosch GmbH, Germany, C. Engdahl, Crystallume, US	
8:00 am	<b>A2-3-1 Invited</b> Environmental Barrier Coatings for Turbine Engines: Current Status and Future Directions, <b>D. ZHU</b> , NASA Glenn Research Center, US	8:00 am	<b>B3-1-1</b> Physical Vapor Partial Filtering for Chemical Composition Control in Hybrid PECVD / EB-PVD Process, <b>C. JAOLU</b> , Université de Limoges - CNRS, France, <b>F. MEUNIER</b> , Sulzer Sorevi, France, <b>P. TRISTANT</b> , J.P. LAVOUTE, C. DUBLANCHE-TIXIER, Université de Limoges - CNRS, France
8:20 am	Invited talk continued.	8:20 am	<b>B3-1-2</b> A Multi Source PECVD Technology for Extremely Planar, Thick and Large-scale DLC Coatings, <b>S. MEIER</b> , S. SCHNAKENBERG, Fraunhofer Institute for Mechanics of Materials, IWM, Germany
8:40 am	<b>A2-3-3</b> Y <sub>2</sub> SiO <sub>5</sub> Coatings Fabricated by RF Magnetron Sputtering, <b>P. MECHNICH</b> , German Aerospace Center (DLR), Germany	8:40 am	<b>B3-1-3</b> A Comparison on the Influence of Different Inert Gases for Reactive HiPIMS and DCMS CN <sub>x</sub> Deposition Processes, <b>S. SCHMIDT</b> , Linköping University, IFM, Thin Film Physics Division, Sweden, <b>ZS. CZIGÁNY</b> , Hungarian Academy of Sciences, Research Centre for Natural Sciences, Hungary, <b>G. GRECZYNSKI</b> , <b>J. JENSEN</b> , <b>L. HULTMAN</b> , Linköping University, IFM, Thin Film Physics Division, Sweden
9:00 am	<b>A2-3-4 Invited</b> Optimum Design of High Temperature Thermal Radiation Energy Reflection Coatings for SiC/SiC Components, <b>Y. KAGAWA</b> , National Institute for Materials Science, Japan	9:00 am	<b>B3-1-4</b> Deposition and Characterization of Advanced DLC Coatings Deposited by Low Frequency Plasma Enhanced Chemical Vapour Deposition (LF PECVD), <b>C. CHOUQUET</b> , DMX sas, France, <b>C. DUCROS</b> , CEA/Liten/DTNM/LTS, France, <b>F. SCHUSTER</b> , CEA Cross-Cutting Programme on Advanced Materials, France, <b>A. BILLARD</b> , LERMPS-IRTES, France, <b>F. SANCHETTE</b> , ICD-LASMIS, Nicci, UTT Antenne de Nogent, France
9:20 am	Invited talk continued.	9:20 am	<b>B3-1-5 Invited</b> State-of-the -Art of DLC Coatings: Industrial Deposition Methods and Tribological Applications 60 Years after the Discovery of DLC, <b>J. VETTER</b> , Sulzer Metaplas, Germany
9:40 am	<b>A2-3-6</b> Tridimensional Analysis of Interfacial Defects Consequences on Delamination of Thermal Barrier Coatings, <b>R. SOULIGNAC</b> , Mines-ParisTech, France	9:40 am	Invited talk continued.
10:00 am	<b>A2-3-7</b> Adsorption of Various REs Atoms on NiAl and Al <sub>2</sub> O <sub>3</sub> Surface: An Implication for Grain Boundary Diffusion in Thermal Barrier Coatings, <b>T. ZHANG</b> , <b>H.B. GUO</b> , Beihang University, China	10:00 am	<b>B3-1-7</b> Modification of Femtosecond-Pulsed Laser Deposited Diamond-Like Carbon films by Temporal Pulse Shaping, <b>F. BOURQUARD</b> , <b>T. TITE</b> , <b>A.S. LOIR</b> , <b>C. DONNET</b> , Laboratoire Hubert Curien, UMR 5516, Université de Lyon, Université Jean Monnet, France, <b>H. FTOUNI</b> , <b>O. BOURGEOIS</b> , Institut Néel, UPR 2940 CNRS, France, <b>F. GARRELIE</b> , Laboratoire Hubert Curien, UMR 5516, Université de Lyon, Université Jean Monnet, France
10:20 am	<b>A2-3-8</b> Microstructure and Thermal Oxidation Behavior of Ytria-Stabilized Hafnia Coatings, <b>E. RUBIO</b> , <b>M. NOOR-A-ALAM</b> , <b>S. STAFFORD</b> , <b>C. RAMANA</b> , University of Texas at El Paso, US	10:20 am	<b>B3-1-8</b> Thermal Stability of DLC-MoS <sub>2</sub> Thin Films in Different Environments, <b>H. NIAKAN</b> , <b>C. ZHANG</b> , <b>J. SZPUNAR</b> , <b>Q. YANG</b> , University of Saskatchewan, Canada
10:40 am	<b>A2-3-9</b> Tribocorrosion Mechanisms in Laser Deposited Titanium-based Smart Tribological Composite Smart Coating, <b>P. OLUBAMBI</b> , <b>M.L. LEPULE</b> , <b>B. OBADELE</b> , Tshwane University of Technology, South Africa, <b>J.O. BORODE</b> , Federal University of Technology, Nigeria	10:40 am	<b>B3-1-9</b> Advanced PECVD Process Control through the use of RF and Plasma Key Parameters for Transfer of Layer Properties, <b>T. GROTJAHN</b> , <b>S. SCHNAKENBERG</b> , Fraunhofer IWM, Germany, <b>R. PLÖTZE</b> , <b>P.H.F. Beratung</b> , Germany, <b>R. ROTHE</b> , Plasmetrex GmbH, Germany, <b>S. MEIER</b> , Fraunhofer IWM, Germany
11:00 am		11:00 am	<b>B3-1-10</b> High-rate Deposition of Dense Hydrogenated Amorphous Carbon Thin Films using High Power Impulse Magnetron Sputtering Based Process, <b>A. AIJAZ</b> , <b>K. SARAKINOS</b> , <b>M. RAZA</b> , <b>U. HELMERSSON</b> , Linköping University, IFM, Plasma and Coatings Physics, Sweden
11:20 am		11:20 am	
11:40 am		11:40 am	
12:00 pm	<b>Exhibition Closes Today</b>  <b>2:00 p.m.</b>		

# Wednesday Morning, May 1, 2013

## New Horizons in Coatings and Thin Films

Room: Sunrise - Session F2-1

### High Power Impulse Magnetron Sputtering

**Moderators:** D. Lundin, Université Paris-Sud 11, France, J. Sapieha, Ecole Polytechnique de Montreal, Canada

8:00 am	<p><b>F2-1-1 Invited</b> Applications of HiPIMS Metal Oxides, v. SITTINGER, O. LENCK, S.K. GURRAM, D. NIEWERTH, G. BRAUER, Fraunhofer IST, Germany</p>	
8:20 am	Invited talk continued.	
8:40 am	<p><b>F2-1-3</b> Optical Coatings Prepared by HiPIMS – Does this Technology Meet our Expectations?, M. HALA, R. VERNHES, O. ZABEIDA, J.E. KLEMBERG-SAPIEHA, L. MARTINU, Polytechnique Montreal, Canada</p>	
9:00 am	<p><b>F2-1-4</b> Epitaxial (001) Oriented Mo/V Superlattice Grown on MgO(100) by HiPIMS, S. SHAYESTEHAMINZADEH, H.P. GISLASON, S. ÓLAFSSON, University of Iceland</p>	
9:20 am	<p><b>F2-1-5</b> High Power Impulse Magnetron Sputtering of Compound Targets, A. ANDERS, Lawrence Berkeley National Laboratory, US, E. OKS, High Current Electronics Institute, Russian Federation, R. FRANZ, C. CLAVERO, R. MENDELSBERG, Lawrence Berkeley National Laboratory, US</p>	
9:40 am	<p><b>F2-1-6</b> TiO<sub>2</sub> Coatings Deposited by Arc Free Deep Oscillation Magnetron Sputtering, J. LIN, Colorado School of Mines, ACSEL, US, B. WANG, Colorado School of Mines, US, W. SPROUL, Reactive Sputtering, Inc., US, Y. OU, Colorado School of Mines, US, I. DAHAN, Nuclear Research Center, Beer-Sheva, Israel</p>	
10:00 am	<p><b>F2-1-7</b> Deposition Rate Enhancement in HiPIMS at Preserved Ionized Fraction of the Deposition Flux, J. CAPEK, University of West Bohemia, Czech Republic, M. HALA, O. ZABEIDA, Ecole Polytechnique de Montreal, Canada, J.E. KLEMBERG-SAPIEHA, Ecole Polytechnique de Montréal, Canada, L. MARTINU, École Polytechnique de Montréal, Canada</p>	
10:20 am	<p><b>F2-1-8</b> Optimization of the Substrate Conditions by Monte Carlo Modeling of Sputtered Particle Transport, D. LUNDIN, C. VITELARU, Université Paris-Sud 11, France, N. BRENNING, Royal Institute of Technology, Sweden, T. MINEA, Université Paris-Sud 11, France</p>	
10:40 am	<p><b>F2-1-9</b> Temporal Characterization of Ion Dynamics in High Power Impulse Magnetron Plasma by Means of Plasma Monitor, Ridded Retarding Field Energy Analyzer and Modified Katsumata Probe, M. CADA, P. ADAMEK, J. OLEJNICEK, Z. HUBICKA, Institute of Physics of the ASCR, v.v.i., Czech Republic</p>	
11:00 am	<p><b>F2-1-10</b> Mechanism of the Instabilities in HiPIMS Discharge and Correlation with Deposition Conditions, A. HECIMOVIC, T. DE LOS ARCOS, V. SCHULZ VON DER GATHEN, J. WINTER, Institute for Experimental physics 2, Ruhr University Bochum, Germany</p>	
11:20 am	<p><b>F2-1-11</b> Influence of High Power Impulse Magnetron Sputtering (HiPIMS) Pulse Shape Regarding Voltage and Current Time Evolution on Plasma Characteristics, Deposition Rate and Ionization for Titanium Aluminum, F. PAPA, Hauser Techno Coating, BV, Netherlands, H. GERDES, R. BANDORF, F. LENZ, G. BRAEUER, Fraunhofer Institute für Schicht und Oberflächentechnik, Germany, T. KRUG, Hauser Techno Coating, BV, Netherlands</p>	
11:40 am		
12:00 pm	<p><b>Exhibition Closes Today</b></p> <p><b>2:00 p.m.</b></p>	

# Thursday Morning, May 2, 2013

<b>Hard Coatings and Vapor Deposition Technology</b> <b>Room: Royal Palm 4-6 - Session B2-1</b>  <b>CVD Coatings and Technologies</b> <b>Moderators:</b> E. Blanquet, CNRS, France, S. Ruppi, Walter AG, Germany		<b>Tribology &amp; Mechanical Behavior of Coatings and Engineered Surfaces</b> <b>Room: Golden West - Session E2-4</b>  <b>Mechanical Properties and Adhesion</b> <b>Moderators:</b> M.T. Lin, National Chung Hsing University, Taiwan, R. Chromik, McGill University, Canada, D. Bahr, Washington State University, US	
8:00 am	<b>B2-1-1 Invited</b> New Developments in the Field of CVD Hard Coatings, I. ENDLER, Fraunhofer IKTS, Germany	E2-4-1	3D Micro Scratch Tests in Combination with a Comprehensive Stress Analysis – a New Tool for the Understanding of Surface Failures, T. CHUDOBA, ASMEC Advanced Surface Mechanics GmbH, Radeberg, Germany, N. SCHWARZER, Saxonian Institute of Surface Mechanics, Germany, A. GIES, OC Oerlikon Balzers AG, Liechtenstein
8:20 am	Invited talk continued.	E2-4-2	A New Dynamic Impact and Sliding Wear Testing Method for the Tribological Evaluation of Treated Surfaces, P. EPAMINONDA, C. REBHOLZ, University of Cyprus, Cyprus
8:40 am	<b>B2-1-3</b> CVD Ti <sub>1-x</sub> Al <sub>x</sub> N Coatings for Mass Production, H. HOLZSCHUH, W. BUERGIN, SuCoTec AG, Switzerland	E2-4-3	Laser Shock Adhesion Test (LASAT) of EB-PVD TBCs: Towards an Industrial Application, G. BÉGUÉ, V. GUIPONT, M. JEANDIN, Mines-ParisTech, France, P. BILHE, J.Y. GUÉDOU, Snecma, SAFRAN Group, France
9:00 am	<b>B2-1-4</b> The Development of a CVD Material for Thermally Oxidative Environments with High Hydrophobicity and Oleophobicity, and Good Wear Resistance with a Low Friction Coefficient, D. SMITH, J. MATTZELA, P. SILVIS, SilcoTek Corporation, US	E2-4-4	Self-organized Thin Film Buckling Patterns, S. GRACHEV, J.-Y. FAOU, Saint-Gobain Recherche, France, G. PARRY, SiMaP, France, E. BARTHEL, Saint-Gobain Recherche, France
9:20 am	<b>B2-1-5</b> Phase Selective Deposition of $\alpha$ -Al <sub>2</sub> O <sub>3</sub> by Thin Layers of TiO <sub>2</sub> , B.E. BOMAN, D. FONDELL, S. MUNKTELL, Uppsala University, Angstrom Laboratory, Sweden, O. ALM, T. LARSSON, Seco tools AB, Sweden	E2-4-5	Determination of the Young's Modulus of Hard Coatings on Soft Polymer Substrates, T. SANDER, S. TREMMEL, S. WARTZACK, Friedrich-Alexander-University Erlangen-Nuremberg, Germany
9:40 am	<b>B2-1-6</b> Influence of the N/Al Ratio in Gas Phase on the Crystalline Quality of AlN Grown by HTCVD on c-sapphire, R. BOICHOT, N. COUDURIER, Grenoble INP, France, E. BLANQUET, M. PONS, CNRS, France	E2-4-6	Nanoscale Mechanical Mapping at a Wide Range of Deformation Rates with AFM, B. PITTEGER, S. MINNE, C. SU, Bruker Nano Surfaces Division, US
10:00 am	<b>B2-1-7</b> Growth of HfC and Nanostructured Multilayer HfC/SiC Coatings by DLICVD, G. BOISSELIER, F. MAURY, CIRIMAT, France, F. SCHUSTER, CEA-Saclay, France	E2-4-7	The Effective Indenter Concept and its Extension into the Time Domain, N. BIERWISCH, N. SCHWARZER, Saxonian Institute of Surface Mechanics, Germany
10:20 am	<b>B2-1-8</b> Industrial Scale Production of HFCVD Diamond Coatings, O. LEMMER, C. SCHIFFERS, M. FRANK, B. MESIC, CemeCon AG, Germany, M. RÜFFER, DiaCCon GmbH, Germany, S. ROSIWAL, University Erlangen-Nürnberg, Germany	E2-4-8	Determining Average Effective X-ray Elastic Constant (AEXEC) of Hard Coatings by Combining $\cos^2\alpha \sin^2\psi$ X-ray Diffraction and Laser Curvature Methods, A. WANG, G.P. YU, J.H. HUANG, National Tsing Hua University, Taiwan, Republic of China
10:40 am	<b>B2-1-9</b> Gradient of Tribological and Mechanical Properties of Diamond-like Carbon Films Grown on Ti6Al4V Alloy with Different Condition of Interlayer Preparation, P. SILVA, G. MARTINS, J. MACHADO, E. CORAT, Instituto Nacional de Pesquisas Espaciais (INPE), Brazil, V. TRAVA-AIROLDI, Instituto Nacional de Pesquisas Espaciais (INPE), Brazil	E2-4-9	Fatigue Property Enhancements of Crystalline Metallic Substrates by Coating Thin Film Metallic Glasses, C.H. CHANG, J.P. CHU, C.M. LEE, National Taiwan Univ. of Sci. and Tech., Taiwan, Republic of China
11:00 am		E2-4-10	Bending Ductility Enhancement of Bulk Metallic Glass by Surface Treatment, J.P. CHU, C.C. YU, National Taiwan Univ. of Sci. and Tech., Taiwan, Republic of China
11:20 am		E2-4-11	Crystal Orientation Effect on the Mechanical Behaviour of Al <sub>2</sub> O <sub>3</sub> Coatings at Ambient Temperature, V. BHAKHRI, Imperial College London - South Kensington Campus, UK, R. MSAOUBI, Seco tools AB, F. GIULIANI, Imperial College London - South Kensington Campus, UK, E. BOUZAKIS, Fraunhofer Project Center for Coatings in Manufacturing (PCCM), Greece
11:40 am			
12:00 pm	<b>ICMCTF 2014 Planning Meeting</b> <b>12:00-1:15 p.m.</b> <b>Room: Royal Palm 4-6</b> <b>All Interested Parties are Welcome</b>	<b>VAMAS TWA 22 Annual General Meeting</b> <b>Mechanical Property Measurements of Thin Films and Coatings</b> <b>Room: Royal Palm 1-3</b> <b>12:15-1:15 p.m.</b>	

## 二、活動照片



圖 1. 作者到會場報到。

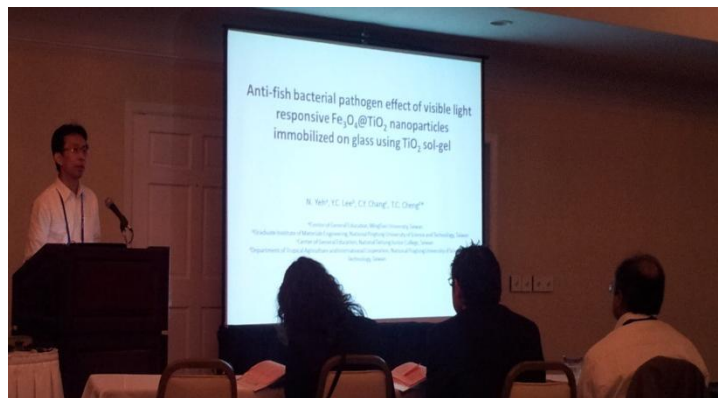


圖 2. 作者在會議中發表論文。