2017 年能源材料奈米科技-鈦氧化物會議心得報告

服務機關：台中榮民總醫院
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派赴國家：法國
出國期間：106/8/6~106/8/14
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摘要

出國人員鄒錫凱受 2017 年能源材料奈米科技-鈦氧化物會議大會邀請以 Taichung Veterans General Hospital, Taiwan 代表身分進行演講: Anticorrosive, antimicrobial and bioactive titanium dioxide coating for surface-modified purpose on biomedical material。會後並與參會人員進行交流。

關鍵字：anticorrosive, antimicrobial, bioactive titanium dioxide.

目次

一、 目的

透過參與國際會議交流，促進報告人對生醫材料鈦金屬及高分子骨材表面處理研發領域能量。

二、 過程

會議進行期間區分為不同主題進行熱烈討論與交換意見，每天早上和下午都各有數場平行的口頭報告議程讓與會者自由選擇參加自己感興趣的主題。會議期間各類別主題歸納如下：

Wednesday, August 9th ROOM A

Session: 2D Materials and devices I
Session: Synthesis and Characterization of Titanium oxides
Session: Titanium Oxides Applications in Biomedical and Healthcare
Session: Magnetic Nanomaterials
Session: 2D Materials and devices II

Thursday, August 10th ROOM A

Session: Application of 2D materials
Session: Transition metal dichalcogenides
Session: Titanium Oxides- General

本人於本場次以 Taichung Veterans General Hospital, Taiwan 代表身分進行演講: Anticorrosive, antimicrobial and bioactive titanium dioxide coating for surface-modified purpose on biomedical material。

Session: Titanium Oxide Catalysis

Session: Technology for 2D material

Thursday, August 10th ROOM B

Session: Magnetic Nanoparticles

Session: Magnetic Nanomaterials

Session: Magnetic Nanoparticles

Session: 2D materials-General I

Friday, August 11th ROOM A

Session: 2D Materials and devices III

Session: 2D materials-General II

Session: Fundamental properties investigation of Titanium Oxides

Session: Titanium Oxides Applications in Solar Cells

Session: 2D materials-General III

大會議程中，眾多場次的講演不乏值得學習之主題。然因平行議程之故，只能做出取捨選擇出席感到興趣的場次。

三、 心得

經過數天緊湊與精采的專題演講與海報展示觀摩之後，對於世界各地專家學者致力於鈦氧化合物發展與展望紛紛提出精闢建議，感到自我學習成長的必要性。對於醫院能夠提供經費補助協助報告人有機會與國際人才交流分享報告人研究，並學習吸收最新資訊，相信在往後的臨床與學術應用上，必能夠更加精進。

四、 建議事項（包括改進作法）

感謝單位長官支持，核准報告人出國參與會議。期望單位長官持續培養後進，為中榮培養更多傑出人才。

附錄

演講內容摘要

Anticorrosive, Antimicrobial, and Bioactive Titanium Dioxide Coating for Surface-modified Purpose on Biomedical Material

In light of the stable bonding structure, photocatalytic characteristics, and negatively charged surface properties of titanium dioxide (TiO_2) material, a multifunctional TiO_2 coating exhibiting anticorrosive, antimicrobial, and bioactive, was used to modify the biomedical material surface via arc ion plating (AIP) technique. According to the JIS Z2801:2000 standard, the antimicrobial activity values of the anatase-TiO_2 coated AISI 304 stainless steel specimens were 3.0 and 2.5, respectively, against *Staphylococcus aureus* and *Escherichia coli*. Such results are far beyond the critical value of 2.0, and categorized as effective antimicrobial surface. TiO_2 coating also provided AISI 304 stainless steel with a corrosion protection, i.e. an increased corrosion potential and a decreased corrosion current in a sodium chloride solution, resulting in a reduced tendency and rate of substrate dissolution as well as a reduced coating of species into the electrolyte. Based on the *in-vitro* and *in-vivo* tests, the rutile-TiO_2 coating can significantly activate the biological characteristics of polymeric polyetheretherketone surface to enhance its bioactivity and osseointegration. Overall, the aforementioned results prove that TiO_2 coatings are highly suitable for surface modifications of biomedical materials used in surgical instruments and implants.