段 興 宇 教授

HSING-YU TUAN, PROFESSOR

- 國立清華大學　學士，民國九十一年
- 美國德州大學奧斯汀分校　博士，民國九十六年

- B.S. Ch.E. National Tsing Hua University, Taiwan, 2002
- Ph.D. Ch.E. University of Texas at Austin, USA, 2007

主要研究領域

- **電化學儲能電池開發**

  主要為高效能電化學儲能電池尤其是鋰離子電池製備的研究。以奈米材料作為電極，經由材料的成分以及結構做調整後用於儲能元件應用。使之做為下一世代的電極材料。

- **奈米材料設計與應用**

  製備金屬, 半導體和高分子奈米材料, 如奈米粒子, 線和管等結構。並控制材料成分, 表面改質, 尺寸分布，以及研究其特殊的光電磁性質，將之用於奈米電子、奈米能源、奈米生醫工程等應用。

Main Research Interests

- **Electrochemical batteries**

  Development of high-performance electrochemical batteries, especially for lithium-ion batteries. Using nanomaterials as electrodes applied on energy storage devices applications through the tuning of materials' composition and structure, thereby making them as next-generation electrode materials.

- **Design and application of nanomaterials**

  Synthesis of metal, semiconductor, and polymer nanomaterials, such as nanocrystals, nanowires and nanotubes and control their composition, surface property, and size distribution to investigate unique nanomaterial properties, including optical, electronic, magnetic, mechanical and catalytic properties resulted from nano-size and quantum confinement effect; Make nanomaterial-based devices such as nanosensors, solar cells, semiconductor electronic devices in applications of biomedical, energy and optoelectronical areas.

代表作 (Selected Publications)

- Wei-Chung Chang, Kuan-Wei Tseng, and **Hsing-Yu Tuan**. "Solution Synthesis ofIodine-Doped Red Phosphorus Nanoparticles for Lithium-Ion Battery Anodes.", NanoLetters, 2017, 17, 1240-1247.
- Guo-An Li, Chiu-Yen Wang, Wei-Chung Chang, **Hsing-Yu Tuan**. "Phosphorus-RichCopper Phosphide Nanowires for Field-Effect Transistors and Lithium-IonBatteries.", ACS Nano, 2016, 10, pp 8632-8644.
- Shu-Hao Chang, Ming-De Lu, Yung-Liang Tung, and **Hsing-Yu Tuan**. "Gram-Scale Synthesis of Catalytic Co_9S_8 Nanocrystal Ink as a Cathode Material for Spray-Deposited, Large-Area Dye-Sensitized Solar Cells", ACS Nano, 7, 9443, 2013.
- Fang-Wei Yuan, Hong-Jie Yang, and **Hsing-Yu Tuan**, "Alkanethiol-Passivated Germanium Nanowires as High-Performance Anode Materials for Lithium-Ion Batteries: The Role of Chemical Surface Functionalization", ACS Nano, 6, 9932, 2012.
- S.-H. Chang, M.-Y.Chiang, C.-C.Chiang, F.-W.Yuan, C.-Y.Chen, B.-Y.Chiu, T.-L.Kao, C.-H.Lai, **H.-Y. Tuan**, "Facile colloidal synthesis of quinary $CuIn_{1-x}Gax(SySe_{1-y})_2$ (CIGSSe) nanocrystal inks with tunable band gaps for use in low-cost photovoltaics", Energy & Environmental Science, 4, 4929-4932, 2011.