



胡啟章 教授

CHI-CHANG HU, DISTINGUISHED PROFESSOR

- 國立成功大學 學士，民國八十年
- 國立成功大學 博士，民國八十四年
- B.S. Ch.E. National Cheng Kung University, 1991
- Ph.D. Ch.E. National Cheng Kung University, 1995

主要研究領域

本實驗室研究興趣在結合電化學科技與材料之結構奈米化、鑑定技術與應用。並討論製備方法、材料特性與電化學應用上之關係。

- **電化學能源材料**
此研究主題主要應用領域為超高電容器、金屬空氣電池、二次電池與太陽能電池。本實驗室是國際上超高電容技術的先驅研究單位。
- **電化學製備前瞻奈米材料**
此研究主題專注於石墨烯、奈米氧化物與其複合材料、規則陽極鋁氧化物與鈦氧化物的開發與應用。
- **光電化學觸媒材料**
此研究主題主要應用領域為光電降解有機物、電化學消毒系統開發、光電催化產氫與二氧化碳還原。
- **電化學感測器與電鍍**
重金屬與生物分子之電化學感測器開發、三價硬鉻電鍍、無鉛錫料合金凸塊電鍍與鐵族合金電鍍。

Main Research Interests

My group mainly focuses on the combination of electrochemistry and nanostructure tailoring for developing advanced materials. The relationships among preparation, textural characteristics, and applications of advanced materials are tried to establish.

- **Electrochemical energy storage/conversion systems**
We focus on developing advanced supercapacitors, metal-air batteries, rechargeable batteries, and solar cells. My group is one of the pioneers in the supercapacitor technologies.
- **Electrochemical preparation of advanced materials**
Nanostructured oxides and composites are electrochemically deposited for novel applications. We also focus on the preparation, characterization of graphene, heteroatom-doped graphene, ordered AAO, and TiO₂ nanotube arrays for various applications.
- **Electrochemical photocatalysis and materials**
We focus on advanced oxidative processes for organic degradation and water purification. We investigate electrochemical photocatalytic processes of hydrogen evolution and CO₂ reduction.
- **Electrochemical sensors and metal/alloy electroplating**
We study electrochemical sensors for heavy metals and bio-molecules detection. We also investigate electroplating techniques of trivalent hard-Cr deposits, lead-free solder bumps, and iron-group alloys.

代表作 (Selected Publications)

- Wu, T.-H., Hesp, D., Dhanak, V., Collins, C., Braga, F., Hardwick*, L. J., **Hu, C.-C.***, "Charge storage mechanism of activated manganese oxide composites for pseudocapacitors", *J. Mater. Chem. A*, vol. 3, pp. 12786-12795, 2015.
- Hsiao, Y.-C., Wu, T.-F., Wang, Y.-S., **Hu, C.-C.***, Huang, C.-P., "Evaluating the sensitizing effect on the photocatalytic decoloration of dyes using anatase-TiO₂", *Applied Catalysis B: Environmental*, vol. 148-149, pp. 250-257, 2014.
- Huang, H.-S., Chang, K.-H., Suzuki, N., Yamauchi, Y.*, **Hu, C.-C.***, Wu, K. C.-W.*, "Evaporation-Induced Coating of Hydrrous Ruthenium Oxide on Mesoporous Silica Nanoparticles to Develop High-Performance Supercapacitors", *Small*, vol. 9, pp. 2520-2526, 2013.
- Wei, T.-Y., Chen, C.-H., Chien, H.-C., Lu, S.-Y.*, **Hu, C.-C.***, "A Cost-Effective Supercapacitor Material of Ultrahigh Specific Capacitances: Spinel Nickel Cobaltite Aerogels from an Epoxide-Driven Sol-Gel Process", *Advanced Materials*, 22, pp. 347-351, 2010.
- **Hu, C.-C.***, Chang, K.-H., Lin, M.-C., Wu Y.-T., "Design and tailor the nanotubular arrayed architecture of hydrrous RuO₂ for supercapacitors of next generation" *Nano Letters*, 6, pp. 2690-2695, 2006.