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DE-HAO TSAI, ASSISTANT PROFESSOR

- 國立成功大學　學士，民國八十七年
- 國立清華大學　碩士，民國八十九年
- 美國馬里蘭大學　博士，民國九十六年

- B.S. National Cheng Kung University, 1998
- M.S. National Tsing Hua University, 2000
- Ph.D. University of Maryland, 2007

主要研究領域

本實驗室研究領域為分散型奈米材料與其在生物醫學與特用化學品領域之應用，目前研究主題包括：

- **功能奈米材料分析鑑定技術**

  針對不同的材料研發適用的分析測量方法，以及結合物理與光譜方法來了解完整與正確的材料性質，並廣泛應用於鑑定各式分散型功能奈米材料（如奈米粒子、蛋白質、奈米柱）。

- **表面化學反應與配方化學最適化**

  探討分散型奈米材料與配方分子之間的反應機制及膠體穩定性，以對其材料性質與配方化學作調整以達到理想的產品性能。

- **功能奈米粒子與其元件之製備**

  建立製備高純度奈米粒子與其元件之技術，包涵以氣溶膠法合成核殼式功能奈米粒子，使用靜電場來純化並控制奈米粒子的移動軌跡用以合成奈米粒子生醫元件。

Main Research Interests

Our research field focuses on suspension-type nanomaterials and their applications in biomedical and specialty chemical products. Current research includes the following three areas:

- **Nanomaterial Characterization**

  Develop suitable methodology and incorporate complementary physical and spectroscopic approaches to provide comprehensive information of material propertiesfor a variety of functional nanomaterials (e.g., nanoparticles, proteins, nanorods).

- **Surface Chemistry of Nanomaterials for Optimization of Formulation Chemistry**

  Study surface interactions of nanomaterials with formulants and colloidal stability of nanoparticles, and optimize their formulation chemistry to achieve the targeted performanceof nanomaterials-manufactured products.

- **Fabrication of Functional Nanoparticles and Their Devices for Biomedical Applications**

  Establish the techniques of generating high-quality functional nanoparticles and their devices. Research scope includes using aerosol-based methods to synthesize core-shell functional nanoparticles and employing electrostatic force to improve the size purity of synthesized nanoparticles and to direct their assembly into devices for biomedical applications.

代表作 (Selected Publications)

- Tai, J.-T., Lai, Y.-C., Yang, J.-H., Ho, H.-C., Wang, H.-F., Ho, R.-M., **Tsai, D.-H.**, "Quantifying Nanosheet Graphene Oxide using Electrospray-Differential Mobility Analysis". Analytical Chemistry, 87, 3884-3889, 2015
- Tai, J.-T., Lai, C.-S., Ho, H.-C., Wang, H.-F., Ho, R.-M., **Tsai, D.-H.**, "Protein Silver Nanoparticle Interactions to Colloidal Stability in Acidic Environments". Langmuir, 30 (43), 12755-12764, 2014
- **Tsai, D.-H.**, Cho, T.J., Elzey, S., Gigault, J .C., Hackley, V.A., "Quantitative Analysis of Dendron-Conjugated Cisplatin-Complexed Gold Nanoparticles Using Scanning Particle Mobility Mass Spectrometry", Nanoscale, 5(12), 5390-5395, 2013.
- **Tsai, D.-H.**, DelRio, F. W., Keene, A. M., Tyner, K. M.,MacCuspie, R. I., Cho, T.J., Zachariah, M. R., Hackley, V. A., "Adsorption and Conformation of Serum Albumin Protein on Gold Nanoparticles Investigated using Dimensional Measurements and In Situ Spectroscopic Methods", Langmuir, 27 (6), 2464-2477, 2011.
- **Tsai, D.-H.**, Cho, T. J., DelRio, F. W., Taurozzi, J.S., Zachariah, M. R., Hackley, V. A., "Hydrodynamic Fractionation of Finite Size Gold Nanoparticle Clusters", Journal of the American Chemical Society, 133 (23), 8884-8887, 2011.