劉 英 麟 教授

YING-LING LIU, PROFESSOR

- 國立清華大學 學士，民國八十年
- 國立清華大學 博士，民國八十五年

- B.S. National Tsing Hua University, 1991
- Ph.D. National Tsing Hua University, 1996

主要研究領域

本實驗室目前研究主題包括：

- **高性能高分子材料**
  以分子設計、有機合成和高分子化學等技術，開發及合成新穎的高性能及功能性高分子。目前的重點包括超低介電高分子、難燃與高耐熱高分子、具自我修復能力的高分子材料等。
- **有機/無機奈米混成與複合材料**
  奈米材料的表面修飾和官能化，是開發奈米混成和複合材料的關鍵步驟，目前研究的奈米材料對象有奈米二氧化矽粒子、碳奈米管、C60、氧化石墨烯等，進行高效能的奈米材料表面修飾，設計開發功能性的奈米混成和複合材料；也進行所開發材料的應用研究，對象包括使用於燃料電池的質子交換膜和電極、生物分離薄膜、白色螢光奈米粒子、抗靜電與抗電磁波材料等。
- **高分子分離膜**
  薄膜科技在節能、資源再生和高效率分離等方面扮演重要角色，目前的研究，包括薄膜表面改質與官能化，並應用於滲透蒸發、生物分離、氣體分離、油水分離等。

Main Research Interests

Current research in my group is focused in the following areas:

- **Synthesis of High Performance Polymeric Materials**
  Basing on molecular design, organic synthesis, and polymer chemistry, we have devoted to preparation of high performance and functional polymers. Current topics include ultra-low-dielectric materials having dielectric constants below 2.0, flame-retardant and thermal-resistant polymers, and self-repairing polymers.
- **Organic-Inorganic Nanohybrids and Nanocomposites**
  Surface modification and functionalization is the critical step for preparation of organic-inorganic nanohybrids and nanocomposites. We try to develop new reaction routes for surface modification of inorganic nanomaterials such as silica nanoparticles, carbon nanotubes, C_{60}, and graphene oxide. Self-assembly behaviors of the nanomaterials are interested in. The prepared materials have been studied for applications in proton exchange membrane fuel cells, bio-separation membranes, white-light photoluminescent materials, and materials for ESD and EMI.
- **Polymeric Membranes**
  Membrane technologies play important roles in energy-saving, resource recovery, and high performance separation processes. The research interests are most on the preparation and modification of membranes and their applications including pervaporation, bio-separation, gas separation, and water/oil separation.

代表作 (Selected Publications)

- C.H. Huang, **Y.L. Liu***, "Self-crosslinkable polymers from furan-functionalized Meldrum's acid and maleimides as effective precursors of free-standing and flexible crosslinked polymer films showing low dielectric constants", *Polym. Chem.* **11**(9), 1606-1613 (2020).
- Y.L. Chang, T.C. Wei, **Y.L. Liu***, "Electrochemical activation of polymer chains mediated with radical transfer reactions", *Chem. Commun.* **56**(17), 2626-2629 (2020).
- C.Y. Tsai, K.J. Peng, C.F. Wang, **Y.L. Liu***, "Creation of lithium ion conducting channels in gel polymer electrolytes through nonsolvent-induced phase separation for high-rate lithium ion batteries", *ACS Sustainable Chem. Eng.* **8**(5), 2138-2146 (2020).
- B.K. Su, C.H. Chang, Y.M. Sun, C.C. Hu, J.Y. Lai, **Y.L. Liu***, "Porous membranes of thermosetting polybenzoxazine resins with interconnected-pores for organic solvent microfiltration", *J. Membr. Sci.* **586**, 267-273 (2019).
- Y.T. Chen, Y.L. Liao, Y.M. Sun, C.C. Hu, J.Y. Lai, **Y.L. Liu***, Lignin as an effective agent for increasing the separation performance of crosslinked polybenzoxazine based membranes in pervaporation dehydration application", *J. Membr. Sci.* **578**, 156-162 (2019)