



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，目前的研究以四氟乙烯薄膜為主要對象，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。

代表作 (Selected Publications)

- 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).
- C.H. Huang, **Y.L. Liu***, "The Michael addition reaction of Meldrum's acid (MA): an effective route for the preparation of reactive precursors for MA-based thermosetting resins", *Polym. Chem.* 10(15), 1873-1881 (2019).
- H.K. Lin, **Y.L. Liu***, "Sulfur radical transfer and coupling reaction to benzoxazine groups: a new reaction route for preparation of polymeric materials using elemental sulfur as a feedstock", *Macromol. Rapid Commun.* 39(8), 1700832 (6 pages) (2018).
- Y.J. Han, **Y. L. Liu***, "2,2,6,6-Tetramethylpiperidyl-1-oxyl (TEMPO) functionalized benzoxazines prepared with a one-pot synthesis for reactive/crosslinkable initiators of nitroxide mediated polymerization", *Macromol. Rapid Commun.* 38(15), 1700078 (6 pages) (2017).
- C.T. Liu, **Y.L. Liu***, "pH-Induced switches on oil- and water-selectivity of crosslinked polymeric membranes for gravity-driven ultrafast oil-water separation", *J. Mater. Chem. A*, 4(35), 13543 - 13548 (2016).
- L. K. Lin, C. C. Hu, W. C. Su, **Y. L. Liu***, "Thermosetting resins with high fractions of free volume and inherently low dielectric constants", *Chem. Commun.* 51(64), 12760-12763 (2015)

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, C₆₀, 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 poly(tetrafluoroethylene)-based membranes and their applications including pervaporation, bio-separation, gas separation, and water/oil separation.

