

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、具修復高分子材料、可回收/再加工熱固性樹脂等。
- **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、氣體分離、油水分離、膠態電解質等。

代表作 (Selected Publications)

- W.T. Tsai, Y.H. Lu, **Y.L. Liu***, "In situ self-healing of gel polymer electrolytes enhancing the cycling stability of lithium ion battery", *ACS Sustainable Chem. Eng.* **12**(20), 7894-7902 (2024). DOI: 10.1021/acssuschemeng.4c01368.
- Y.H. Wang, D.Y. Hung, **Y.L. Liu***, "Is a vitrimer with a high glass transition temperature available? A case study on rigid polyimides crosslinked with dynamic ester bonds", *Macromol. Rapid Commun.* **45**, 2400312 (2024). DOI: 10.1002/marc.202400312.
- C.Y. Lai, Y.M. Sun, **Y.L. Liu***, "Water-soluble ozonated lignin as a hydrophilic modifier for poly(vinyl alcohol) membranes for pervaporation desalination", *J. Membr. Sci.* **685**, 121959 (2023). DOI: 10.1016/j.memsci.2023.121959.
- Y.S. Lai, **Y. L. Liu***, "Reaction between 1,3,5-triisopropylbenzene and elemental sulfur extending the scope of reagents in inverse vulcanization", *Macromol. Rapid Commun.* **44**(8), 2300014 (2023). DOI: 10.1002/marc.202300014.
- D.Y. Hung, **Y.L. Liu***, "Meldrum's acid mediated ketene chemistry in formation of ester bonds for synthesis of vitrimers with high glass transition temperatures", *Polym. Chem.* **14**(12), 1339-1349 (2023). DOI: 10.1039/d2py01559e.

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, self-repairing polymers, and vitrimers.
- **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 membranes and their applications including pervaporation, gas separation, water/oil separation, and gel polymer electrolytes.



教授簡介

Department of Chemical Engineering

