何 榮 銘 教授

RONG-MING HO, PROFESSOR

- 美國艾克隆大學　高分子科學博士，民國八十四年
- Ph.D. Institute of Polymer Science, University of Akron, USA, 1995

主要研究領域

本研究室為「前瞻高分子研究室」，研究的核心主題為「軟物質材料之自組裝行為研究」、「高分子奈米混成材料與無機多孔材料之分子設計、製備與應用平台技術之開發」、「奈米圖案成形技術開發與應用」。

目前研究之主要課題如下：

- **高分子嵌段共聚物與超分子之自組裝行為與功能探討**

  探討不同自組裝驅動力，如親疏水性、氫鍵、凡得瓦爾力、離子鍵等非共價鍵作用力相互影響與競爭下，所形成特定之奈米微結構與形態的行為與機制，特別是操控分子的掌性效應對於自組裝的影響，進行仿生材料的製備與功能之開發。

- **高分子奈米混成材料與無機多孔材料之製備與應用**

  探討有機與無機奈米混成材料與奈米多孔材料之製備與機制，建立此類材料製備平台技術與實際應用的基礎，瞭解於奈米尺度下所呈現的特殊物理性質與功能性，開發高分子混成材料與奈米多孔材料之多元性與多樣性，以期應用於光電、能源與生醫領域。

- **奈米圖案成形技術開發與應用**

  奈米圖案為具有奈米尺寸規則排整之形態，由於高分子嵌段共聚物可自組裝形成獨特之奈米微結構，且兼具易成膜、成形與可撓曲性及低成本性的優點，以此所建構之奈米圖案成形平台技術，將可整合微機電製程，製備具創新應用之各類新穎奈米薄膜材料。

Main Research Interests

The central theme of our research laboratory is the Frontier Polymer Research. We focus on researches in “Self-assembly of Soft Matter”, “Hybridization of Polymeric and Inorganic Materials” and “Molecular Design, Fabrication and Applications of Polymeric Nanohybrids and Nanoporous Materials” as well as “Nanopatterning from Block Copolymers. Current research objectives include:

- **Self-assembly of Block Copolymerss and Supramoleucles**

  The self-assembly of block copolymer and supramolecules by cooperating non-covalent bonding forces, such as hydrophilicity, hydrogen bonding, van der Waal force, and ionic force, give rise to a variety of nanostructures and morphologies. We are interested in the formation of those nanostructures and morphologies and its corresponding mechanisms, in particular the effect of chirality on the self-assembled architectures. The final goal is to mimicking the self-assembly of biological materials for functions and complexity.

- **Hybridization of Polymeric and Inorganic Materials**

  Integration of organic and inorganic components is one of promising approaches to construct functional materials with significant impact in the variety of research fields. The major concept of organic-inorganic nanohybrid systems is to uniformly disperse inorganic species within organic matrix (namely, templating) for the formation of ordered nanostructures. We are interested in combining the properties of nanostructures and inorganic materials for novel applications using block copolymers as templates for templated syntheses.

- **Nanopatterning from Integration of Top-down and Bottom-up Methods**

  Nanopatterning is the technique to create regular topographic or composition nanopatterns. By taking advantage of easy processing, film formation and low cost as well as flexibility for nanopatterning from block copolymer self-assembly, it is highly appealing in applications. We are interested in the platform technology to create large-scale, well oriented nanostructured patterns by integration of top-down MEMS process and the self-assembly block copolymers.

代表作 (Selected Publications)

- Hsueh H.-Y. ; Yao C.-T. ; **Ho, R.-M.*** “Well-Defined Nanohybrids and Nanoporous Materials via Degradable Block Copolymer Templating” *Chem. Soc. Rev.,* 44, 1974-2018, **2015**
- Wang H.-F. ; Yu L.-H. ; Wang X.-B. *; **Ho, R.-M.*** “A Facile Method to Fabricate Large-Scale Double Gyroid as Polymer Templates for Nanohybrids” *Macromolecules*, 47, 7993-8001, **2014. Front Cover Story**
- Hsueh, H.-Y. ; Ling, Y.-C. ; Wang, H.-F. ; Chang Chien, L.-Y. ; Hung, Y.-C. ; Thomas, E. L. ; **Ho, R.-M.*** “Shifting Networks to Achieve Subgroup Symmetry Properties”, *Adv. Mater.*, 26: 3225-9, **2014. Front Cover Story**
- She, M.-S. ; Lo, T.-Y. ; **Ho, R.-M.*** “Long-Range Ordering of Block Copolymer Cylinders Driven by Combining Thermal Annealing and Substrate Functionalization”, *ACS Nano*, 7, 2000-2011, **2013**.
- **Ho, R.-M.*** ; Li, M.-C. ; Lin, S.-C. ; Wang, H.-F. ; Lee, Y.-D. ; Hssegawa, H. ; Thomas, E. L. “Transfer of Chirality from Molecule to Phase in Self-Assembled Chiral Block Copolymers”, *J. Am. Chem. Soc.*, 134: 10974-10986, **2014**.