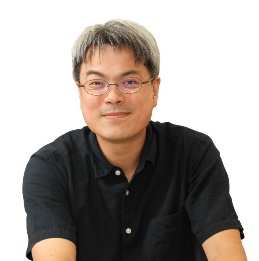
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| 時間 | **2025年12月12日(五) 15:20 PM  主持人：孫亞賢 教授**  **發佈人：謝馨瑩** |
| 講者 | **王建隆 教授** |
| 服務單位 | **台灣大學 化學系** |
| 講題 | **Water-Driven Self-Assembly Pathways for Thermostable and Adaptive Supramolecular Materials** |
| 地點 | **93456** |
| 語言 | **中文** |
| 摘要 | Nature exploits non-covalent interactions, with water as a key mediator, to stabilize biomolecular structures and direct their functional conformations under extreme environments. Inspired by this principle, we investigated how water can guide and reinforce supramolecular assemblies in synthetic systems. Two dendritic amphiphiles were studied: a branched amphiphile forming hydrated hexagonal columnar (Colh) phases via water-induced self-assembly (WISA), and a wedge-shaped, shape-shifting dendron (SD) undergoing rare phase transitions upon hydration. In the Colh phase, artificial water channels (AWCs) encapsulate both bulk-like and interfacial water, whose hydrogen-bonded networks confer thermophilicity, preventing isotropization even above the boiling point of water while simultaneously accelerating water transport at elevated temperatures. For the SD system, cooling from the isotropic melt trapped molecules in a metastable Frank–Kasper σ phase with symmetry breaking. Water vapor disrupted micellar packing and unfolded cone-shaped SDs, enabling improved chain–chain ordering and inducing a σ → hydrated lamellar (Lw) transition. Encapsulated water molecules further stabilized the Lw, double-diamond quasicrystal (DDQC), and hydrated σ phases. Collectively, these findings establish water as an active structural modulator in synthetic supramolecular chemistry: it not only enhances thermal robustness and transport properties but also guides conformational ordering to unlock new phase behaviors, echoing nature’s strategies for adaptive molecular organization.  **REFERENCES**   1. Chen, Y.; Chang, H.-Y.; Lee, M.-T.; Yang, Z.-R.; Wang, C.-H.; Wu, K.-Y.,\* Chuang, W.-T, Wang C.-L. “Dual-Axis Alignment of Bulk Artificial Water Channels by Directional Water-Induced Self-Assembly” *J. Am. Chem. Soc.* **2022**, *144*, 7768–7777. 2. Chen, C.-Y.; Chen, Y.; Chang, T.-Y.; Lee, M.-T.; Liu, S.-Y.; Yu, Y.-C.; Lin, Y.-H.; Lee, C.-H.; Chen, H.-L.; Wu, K.-Y.; Chuang, W.-T.; Wang, C.-L. “Thermophilic artificial water channels of a lipid-like dendron stabilized by water-containing hydrogen-bonded network” *Giant*, **2024**, *17*, 100220. 3. Wang, C.-L., Chuang, W.-T., Lee, M. T., Wang, Y. R., Chen, S. Y., Huang, H. J., ... Jeng, U. S., “Deactivating Symmetry Breaking of a Soft Frank–Kasper Phase via Water-Induced Conformational Ordering of a Shapeshifting Dendritic Amphiphile” *ACS Appl. Mater. & Interfaces***, 2025**, *17*, 21, 31403–31410. |
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**Seminar Information**

**相片：**