

演題 : Expanding the Scope of Surface-Initiated Polymerization**講師 : Prof. Harm-Anton Klok**Institutes of Materials, Ecole Polytechnique
Fédérale de Lausanne (EPFL), Switzerland

日時 : 2024年5月14日 (火) 14:30~15:30

場所 : フロンティア応用科学研究棟 2階セミナー室



Abstract: Surface-grafted polymer thin films, which are commonly referred to as polymer brushes, have emerged as a unique class of surface coatings. Chain-end tethering polymers in close proximity using surface-initiated polymerization methodologies enforces a stretched conformation of the polymer grafts, which leads to several unique materials properties. Polymer brush films, for example, can be designed that are exceptionally effective in preventing biofouling, or which possess extraordinarily low friction coefficients.

This presentation will highlight three recent discoveries from our laboratory that take advantage of surface-initiated polymerization reactions to generate polymer surface coatings with unique properties. In a first example, it will be shown how surface-grafted polymer films can be designed and prepared that display piezo- and pyroelectric properties, which is of great interest e.g. for energy harvesting applications. In a second example, it will be shown how, for a polymer film of a given thickness and composition, solvent uptake and swelling can be controlled, essentially by molecular engineering at the polymer brush – substrate interface. Since solvent swelling is essential to non-fouling and lubrication applications, this provides a new approach to engineer such properties. Finally, it will be shown how concepts from supramolecular chemistry can be harnessed to generate surface-grafted polymer films that potentially could be grown and removed in a repetitive, reversible manner.

References: 1) *Macromolecules* **2023**, 56, 9915; 2) *Adv. Mater.* **2024**, 36, 2307038;
3) *Angew. Chem. Int. Ed.* **2023**, 62, e202305930

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