From Soft Matter to Crystals:
Crafting Complexity, Chirality, and Fascinating Structures in Material Design

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Self-assembly is one of nature's most powerful and fascinating strategies for creating order from chaos. As Paul J. Flory brilliantly put it: "Self-assembly is nature's way of creating complexity without complexity." This process spans a wide range of materials, from soft self-assembled nanoarchitectures to highly ordered crystalline structures, all governed by the same principles.

Metal-organic frameworks, plasmonic materials and soft nanoarchitectures show how self-assembly dictates molecular packing, morphology and properties. MOFs' tunability enables diverse architectures with unique functionalities, while plasmonic materials harness light-matter interactions for applications like sensing. Soft materials, on the other hand, demonstrate dynamic, reconfigurable structures with amazing potential.

A particularly exciting aspect is chirality, where self-assembly leads to the spontaneous formation of chiral structures even from achiral elements. This phenomenon, seen across all material types, has profound implications—not just for applications, but also for understanding the mechanisms that may have sparked the origin of life.

This seminar is a journey through different materials, each playing a unique role, yet all bound by the common thread of self-assembly. From molecular design to complex crystal growth, we will explore how this principle orchestrates function and structure across scales. As we unveil the extraordinary shapes and patterns that emerge - curved, chiral and seemingly sculpted with intention - it will become clear that chemistry is not just a science but an art, capable of crafting forms so intricate that they could belong in a gallery as much as in a laboratory.