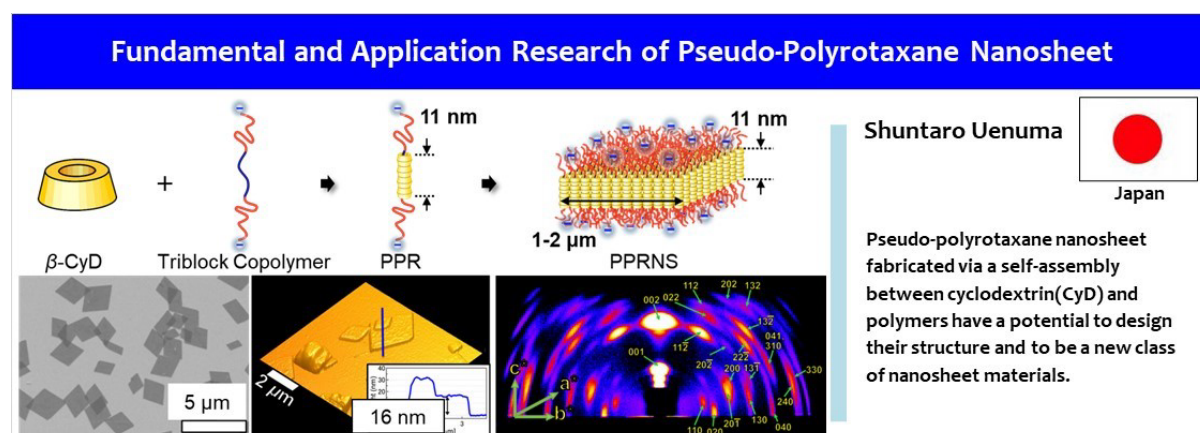


<Research Topics>

Fundamental and Application Research of Pseudo-Polyrotaxane Nanosheet

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Pseudo-polyrotaxane nanosheet fabricated via a self-assembly between cyclodextrin(CyD) and polymers have a potential to design their structure and to be a new class of nanosheet materials.

Research

Nanosheet materials have the ultrathin thicknesses and large lateral dimensions. Owing to their characteristic properties such as shape, anisotropy, and large specific surface area, nanosheets materials are expected to be used in a variety kind of functional materials. The conventional nanosheets are comprising of inorganic atoms. Recently, I have fabricated the self-assembled nanosheet material, which is called “pseudo-polyrotaxane nanosheet (PPRNS)”. The fabrication method is just mixing β -cyclodextrin (CyD) and poly (ethylene glycol)-b-poly(propylene glycol)-b-poly(ethylene glycol) triblock copolymer in water at room temperature. β -CyDs spontaneously threaded on central PPO segment of triblock copolymer and form a columnar structure, resulting in nanosheet particles with the edge length of 1–2 μm and the thickness of 16 nm (thickness of CyD layer is 11 nm, which is equal to the length of PPO segment). PPRNS have great potential due to their structural designability (surface chemistry and geometry), biocompatibility, environmental friendliness, and mass producibility. My target is to reveal the assembly and disassembly mechanisms and establish the methods to design PPRNS structures. Furthermore, since PPRNS is a new kind of nanosheet material with a topological supramolecular structure, utilizing the unique properties of PPRNS will expand the application fields of nanosheet materials. I am also conducting research on the applications of PPRNS.

Comments

I am delighted to join the ICYS within NIMS. Before joining ICYS, I worked at The University of Tokyo for about four years. The ICYS fellowship is highly coveted due to its research funding, facility support, and opportunities for professional growth. ICYS hosts numerous talented young scientists, offering abundant networking and collaboration opportunities. The scientists of NIMS provide us grateful ideas and advices for not only experiment but also planning of research with perspective. This situation is very supportive and stimulative, and receiving an ICYS fellowship is a great honor.

Link

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