

# Liquid Crystalline Polymer Materials

Associate Prof. Dr. Mitsuo Hara

Fac. of Eng. and Design, Kagawa Univ.

E-mail: hara.mitsuo [at] kagawa-u.ac.jp

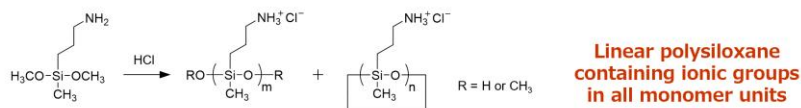


Our group is engaged in research to functionalize soft materials such as polymers, liquid crystals, and colloids by utilizing surfaces, interfaces, and light. Recently, we have also been working on developing soft materials that can be functionalized in wet environments and proposing new applications for inorganic polymers. Below are some examples of our recent work. We are also conducting joint research related to surface modification and molecular orientation.

## I: Development of Functional Ionic Polysiloxanes

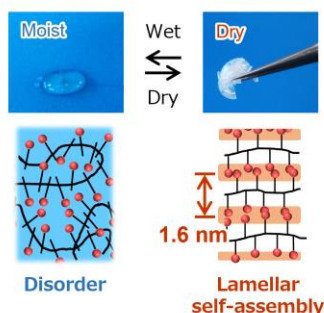
By introducing ionic groups into polysiloxanes, which were traditionally considered to be soft and insoluble in water, we have found that they become hard and water-soluble. We have discovered many other new functions as well. We are exploring new uses for the abundantly available polysiloxanes and extending their application to the creation of low-friction surfaces.

Synthesis of polysiloxane using bifunctional silane coupling agents as starting materials

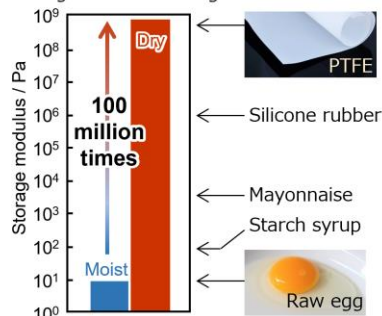


Unique properties

### 1. Hygroscopicity and self-assembly



### 2. Large modulus change



### 3. Adhesion



## II 2: Control of the Arrangement of Organic-Inorganic Mesophases

Arranging the self-assembled structures of organic liquid crystals and mixing them with inorganic substances enables us to fix the fluid liquid crystals, making it possible to use them as functional materials. We have achieved the hybridization of various organic liquid crystals, from low-molecular-weight to high-molecular-weight, with inorganic substances.