[The Purpose and Concept of Our Group]

Fluorine-containing polymers are well-known for their unique thermal, electrical, and optical functions. In addition, fully aromatic polymers containing many benzene rings in their main chains exhibit high heat resistance and good electronic properties, and serves as a representative rank of high performance polymers. Fluorinated polyimides are novel material combining the high functionalities of fluorine and the high heat resistance of polyimide.

Our laboratory aims at proposing and proving key concepts for designing novel fluoropolymers which demonstrate outstanding optical and electronic functionalities accompanying with high thermal and environmental stability for the Future Information-Technology Society. Our methodology is based on the knowledge of 'what kinds of structures and what kinds of mechanisms are essential and indispensable for the molecular design of high performance polymers'. We have high commands at quantum chemical calculations and a variety of non-conventional measurements and spectrosopies, such as \(^{19}\text{F}\) solid-state nuclear magnetic resonance (NMR), polarized attenuated total reflection-IR, near-IR absorption and reflection, fluorescent emission, refractive index & birefringence, with varying temperature, pressure, and atmosphere.

[Keywords]

- Structural Analysis by Solid State \(^{19}\text{F}\) MAS NMR
- Novel Fluoropolymers Exhibiting Unique Optical Properties for Optical Waveguide Circuits
- Quantum Chemical Calculations using Super-Com
- Molecular Design, Synthesis, and Characterization of Fluoropolymers
- Optical Spectroscopies in UV/Vis/Near-IR/IR regions
- Passive Optical Properties, Refractive Index, and Birefringence
- Optically Active Fluoropolymers for Organic EL and Lasers
- Nano-composites of polymers and inorganic/metalllic particles
- Micro-structure & Electronic Structure Analysis of Fluoropolymers