

Development of External Stimuli-responsive Dynamic Molecular Materials with Optical and Mechanical Functions

(RIES, Hokkaido University) ○Yuna Kim

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The development of chromic molecular systems whose optical properties change in response to external stimuli such as light, heat, electricity, and pressure has been a core issue in the field of information transmission and display, as well as in the construction of molecular systems that imitate the structure and function of living organisms. While research has been conducted on the creation of light-driven artificial molecular motors and multiple response-multiple output systems, major challenges are still ahead regarding control over dynamic and autonomous functions. In this presentation, the focus is on the dynamic functional molecular systems as well as their triggering processes. Responsive behavior will be illustrated based on a new chromic molecular system with a highly functional response system or additional functions by appropriate molecular design. The flexible controllability of their optical and dynamic functions will be introduced such as chiral molecular switches with photoresponsive mechanical functions, molecules that can activate photopolymerizability by mechanical stimulation, and multi-functional electrochromic molecules.