Visiting Professors

Visiting Professor
SASAI, Hiroaki *(from Osaka University)*

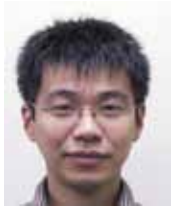
Design and Synthesis of Novel Enantioselective Catalysts and Their Application

Synthesis of optically active complex molecules using catalytic amount of chiral compounds plays an important role in pharmaceutical industrial processes. Our group engages in the development of novel enantioselective catalyses which involve asymmetric domino reaction promoted by an acid-base type organocatalyst, oxidative coupling of 2-naphthol derivatives using dinuclear vanadium(V) catalysts, spiro bis(isoxazoline) ligand (SPRIX) accelerated Pd catalyses, *etc*. Recently we have realized a highly enantioselective intramolecular Rauhut-Currier reactions catalyzed by an amino acid derived organocatalyst. In addition, an umpolung acetoxylation of Pd enolate derived from alkynyl cyclohexadienones was found to be promoted by Pd-SPRIX catalyst.

Visiting Associate Professor
UEMURA, Takashi *(from Kyoto University)*

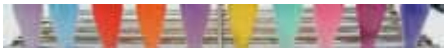
Polymer Chemistry in Coordination Nanospaces

One of the most outstanding challenges in polymer materials science is the fabrication of systems that allow the controlled arrangement of monomers to be polymerized to materials useful for a desired purpose. We are developing strategies to control polymerizations in nanochannels of Metal–Organic Frameworks (MOFs) composed of metal ions and organic ligands. Use of their regulated and tunable channels for a field of polymerization can allow multi-level controls of the resulting polymer structures, such as molecular weight, stereoregularity, reaction positions, and monomer sequences. In addition, construction of nanocomposites between MOFs and polymers provides new material platforms to accomplish many optical and electronic functions.



Visiting Associate Professor
SUDO, Yuki *(from Nagoya University)*

Understanding and Controlling the Photoactive Proteins



Light is one of the most important energy sources and signals providing critical information to biological systems. Rhodopsin molecules are photochemically reactive membrane-embedded proteins, with seven transmembrane α-helices which bind the chromophore retinal (vitamin A aldehyde). A striking characteristic of these photoactive proteins is their wide range of seemingly dissimilar functions. We are investigating them by using various techniques such as biophysical, molecular biological, biochemical, genetical and spectroscopic methods. In addition, rhodopsin molecules have great potential for controlling cellular activity by light. We are also focusing on the development of novel photocontrollable tools for the life scientists.