

# Visiting Professors



Visiting Professor  
**ITOH, Shinobu** (*from Osaka University*)

### Dioxygen Activation Mechanism by Copper Proteins and Models

The structure and reactivity of copper/active-oxygen complexes have attracted much interest during the past decades because of their potential relevance to biological systems and numerous copper-catalyzed oxidation reactions. In our laboratory, we have been studying the reactivity of several types of copper/active-oxygen species such as mononuclear copper(II)-superoxo and copper(II)-hydroperoxo complexes as well as dinuclear copper(II)-peroxo and bis( $\mu$ -oxo)dicopper(III) complexes in order to evaluate the catalytic mechanism of copper oxygenases and to develop efficient oxidation catalysts for organic synthesis.



Visiting Professor  
**TAKAHASHI, Satoshi** (*from Tohoku University*)

### Dynamics of Protein Folding by Single Molecule and Ensemble Techniques

Protein is a linear macromolecule that has a unique property to fold to a specific three-dimensional structure from fully unfolded conformations. We are interested in the physical principles that connect the unfolded and the folded conformations of proteins. To detect fast kinetic processes involved in protein folding, we use rapid mixing device for the time resolved observation of average protein structures. To observe heterogeneity and dynamic fluctuations, we use single molecule observation systems. Based on the ensemble measurements on several proteins using small angle X-ray scattering and circular dichroism spectroscopy, we proposed “collapse and search” mechanism of protein folding. The recent application of single molecule fluorescence measurements clarified a relatively slow conformational dynamics in the unfolded state. We are hoping to obtain important information required for the protein structure prediction and design through the further examination of protein folding dynamics.



Visiting Associate Professor  
**HASEGAWA, Miki** (*from Aoyama Gakuin University*)

### Development of the Polarized Emission System of Lanthanide Complexes in the Nano-Thickness Molecular Films

The nano-thickness molecular films containing lanthanide ions induce the polarized emission. The phenomenon is not generally observed from both a fluorescent organic compound and a lanthanide ion. However, we firstly succeeded to construct functional multilayers by the Langmuir-Blodgett (LB) method. The film containing the Pr(III) layer showed the polarized  $\pi\pi^*$  emission of the inserted aromatic molecule, which was slightly affected by the interaction with metals. On the other hand, the Eu(III) layer within the film led to the polarized ff-emissions of metal ion itself. The principle should be clarified from the viewpoint of molecular science. We are in progress to reveal the relation between the structure around metals and the photo-phenomena of the lanthanides' LB film.