Seminar

日時：20 Feb. 2020 (Thr) 10:00～11:30
場所：自然科学研究棟１号館５階　演習室 512

講師：Associate Professor Régis Guégan

School of Advanced Science and Engineering, Waseda University, Tokyo, Japan 早稲田大学先進理工学部

タイトル：Singular assemblies of mixture of colloids for diverse environmental applications

Colloids consist of suspensions of particles of which size is comprised between 1 nm and 10 mm in a dispersing medium and are quite common in the nature (fog, opal, smoke…). Anisotropic colloids such as nanosheets, derivated from the exfoliation of layered materials, form swollen liquid crystalline structure of regularly stacked sheets. These liquid crystalline phases can bring further possibilities and be used as template systems for the orientation of other species such as flexible organic moieties. Alkylpoly(ethylene oxide) nonionic surfactants (C_nE_m) are amphiphilic molecules that self-organize in a variety of distinct morphologies that can be used as model systems to mimic cell-as well as soft template systems for the synthesis of silica based mesoporous materials. However, the orientation, at a macroscopic scale, of these assemblies represent somehow a difficult task to perform for further possible applications.

In this contribution, we show the association of nanosheets (clay minerals, graphene oxides…) with alkylpoly(ethylene oxide) nonionic surfactants leads to interesting novel nanostructures that display birefringent properties. The resulting assemblies can find some echo's in several applications such as adsorbents in water remediation strategies, biocompatible reinforcers in biodegradable polymer matrix, or as immobilizing matrixes for yeasts in the conception of active biosensors.

講師：Professor Mikael Motelica-Heino

Université d'Orléans, Orléans, France オルレアン大学

タイトル：Trace elements cycling in hot spots of the critical zone (redox microniches, rhizosphere, drilosphere). Implications for the phyto and bio remediation of contaminated soils.

Essential in the biogeochemical functioning of continental ecosystems, trace elements in the critical zone are involved in dynamic geochemical transformations that are often driven by biologically controlled processes. While changes in redox state offer general mechanisms for supply and removal of metal(loid)s from solution, there may be specific linkages of particular elements of precise mechanistic linkages between the geochemistry and biota. Surface environments are made of a three-dimensional mosaic of micro-habitats with various redox conditions coined biogeochemical "hotspots" such as redox "microniches", freshly recruited material at sediment-water interface, rhizospheric soil, the few millimeters of soil covering the roots of plants and influenced by their biological activity, and drilosphere (area for earthworm activities like bioturbation) … These dynamic small-scale systems characterized by feedback interactions between soil/sediment characteristics, plant roots and dynamics of the associated microbial communities play an essential role in the transformation of organic matter, nutrients and trace metals. Results illustrating root-mycorrhizae-bacteria associations in the mobility, availability and toxicity of trace metals will be discussed as it is a major challenge to understand the ecodynamics of trace metals in the context of phytoremediation or natural attenuation of contaminated soils and as for providing a theoretical basis for building a earthworm-accumulator plants combined bioremediation system.

Biosignal Research Center, Hideyuki Inui (hinui@kobe-u.ac.jp)