

Development of Measurement Methods and Analytical Reactions in Nanochemistry at the Liquid-Liquid Interface

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【 Outline of survey 】

Measurements and control of various reactions taken place at liquid-liquid interfaces with a few nm thickness are crucially important for understanding reaction mechanisms and developing useful reactions in solvent extraction chemistry, interfacial molecular recognition, interfacial synthesis and interfacial bio-catalysis. We have invented some new measurement techniques of interface and micro-particles recently. However, the measurement of the interfacial reaction at the nano-region has still many difficulties. In the present project, we will develop more innovative experimental techniques of the interface, explore the new subjects of the chiral recognition at the interface and control the interfacial reaction by physical external field. The subjects of our project are,

- 1) Invention of innovative measurement methods of interfacial nano-region to clarify the molecular mechanism of the interfacial reaction
- 2) Development of experimental methods to measure the chirality of the interfacial species, and creation of chiral recognition reaction at the liquid-liquid interface
- 3) Elucidation of the interfacial aggregation mechanism of metal complexes and the catalytic mechanism of the interfacial enzyme reaction
- 4) Control of the interfacial reaction by the external field, especially by magnetic field, and the development of magnetic field assisted analytical interfacial reaction

【 Expected results 】

The outcome of our research will be expected as follows, 1) Invention of new experimental methods which are useful for the development of interfacial nanochemistry, 2) Development of chiral measurement technique of the interface which will stimulate the research of nano- biochemistry, 3) Elucidation of magnetic field effect on the interfacial reaction, which will have great contribution to the new magnetics of soft materials, and 4) Production of new functional nano-materials from interfacial aggregates and establishment of control method of interfacial catalysis which is very useful for bio-technology.

【 References by the principal researcher 】

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H. Watarai, M. Suwa and Y. Iiguni, Anal. Bioanal. Chem., 378, 1693-1699 (2004).

【 Term of project 】 F Y 2004 - 2008

【 Budget allocation 】 86,700,000 yen

【 Homepage address 】 <http://www.chem.sci.osaka-u.ac.jp/lab/watarai/>