A. Research Activities (2010.4-2011.3)

A-1. Main Subjects

a) Oxidation-reduction reactions relevant to biological phenomena

Structure and function of fructose dehydrogenase from acetic acid bacterium (molecular cloning, structural analysis of active site, thermochemical and dynamic properties, electrode reaction, etc.). Single mutation of multicopper oxidaze and its function analysis. Interaction between the enzymes and various electrode materials. Purification of enzymes concerning alcohol oxidation.

b) Fundamental study of bioenergy conversion system and its application to biofuel cell


c) Biosensor
d) Fundamental study of transmission processes on biological electric signals

Mechanism on nervous transmission by use of liquid membrane cells. Electrochemical study on anesthetic functions.

e) Fundamental study on charge (ion and electron) transfers across biomembranes

Electrochemical analysis on ion transport across planar lipid bilayers in the presence of hydrophobic ions and ionophores such as ion channels, carrier compounds, etc. Ion transport across liposomal membranes. Electron transfer at the surface of supported BLM. Function of ion channels using planar bilayer lipid membranes (Effect of coexisting ions, Reaction mechanism of accelerator and inhibitor).

A-2. Publications and presentations

a) Publications

Books


Original Papers (including book-reviews)


Microarray electrode for biosensor. Enzyme modified electrode.


- Electrochemical oxidation of glucose and its application to glucose sensors, Seiya Tsujimura, vitamins, 84 (5/6), 261-264 (2010).

- Biofuel cells, Kenji Kano, Chemistry and chemical industry, 63 (11), 897-899 (2010).


- Research and developments of biofuel cell, Seiya Tsujimura, Chemical industry, 61 (2), 9-14 (2010).

b) Conference and seminar papers presented

- The 217th Annual Meeting of Electrochemical Society: 3 reports

- The 71th Annual Meeting of the Japan Society for Analytical Chemistry: 5 reports

- ACEC 2010: 1 report

- Gordon Research Conference: 1 report

- The 4th summer seminar of Kansai Branch of the analytical chemical society of Japan: 3 reports
A-3. Off-campus activities 1

Membership in academic societies

- Kano, Kenji : The Electrochemical Society of Japan (an adviser of Kansai Branch), The Japan Society for Analytical Chemistry (a council member, an organizer of Kinki Branch), The Japan Society for Bioscience, Biotechnology, and Agrochemistry (a director), The Polarographic Society of Japan (a director), 2011 International Congress on Analytical Science, Local Organizer Committee Member, 2011 International Society of Electrochemistry, Local Organizer Committee Member

- Shirai, Osamu : The Electrochemical Society of Japan (an organizer of Kansai Branch), The Japan Society for Analytical Chemistry (an organizer of Kinki Branch), The Polarographic Society of Japan (the accountant director, a council, a secretary)

- Tsujimura, Seiya : The Polarographic Society of Japan (a council), The Japan Society for Bioscience, Biotechnology, and Agrochemistry (a delegate)

A-3. Off-campus activities 2
Research grants

1. Grants-in-aid for Scientific Research (KAKENHI)

- Scientific Research (C) : Shirai, Osamu : Analytical Method on ion transport across biomembranes by use of ion channels

- Excellent Young Researcher Overseas Visit Program : Tsujimura, Seiya : Development of porous functional enzyme electrodes modified by redox polymers and their application

- Grant-in-Aid for Exploratory Research : Kano, Kenji (Hideto Miyoshi) : Development of Electroconductive Quinone-modified Electrodes to Realize Sensitive Assay of Respiratory Chain Enzymes

A-4. International cooperation and overseas activities 1

Membership in academic societies

- Kenji Kano: The Electrochemical Society (Member), Analytical Biochemistry (Executive Editor), Journal of Electroanalytical Chemistry (Editorial Board)

- Osamu Shirai:

- Seiya Tsujimura: The Electrochemical Society (member), Internationall electrrochemical society (member)

International meetings (country, roles)

- Kenji Kano : The 217th Annual Meeting of Electrochemical Society (Canada, Keynote lecture and Organizer), Gordon Research Conference on Fuel Cell (USA, Invited)

- Shirai Osamu : ACEC 2010 (Keynote lecture, Kumamoto Japan, Keynote lecture)
A-4. International cooperation and overseas activities

Visiting Research Scholars

- researcher 1 (Taiwan)

B. Educational Activities (2010.4-2011.3)

B-1. On-campus teaching

a) Courses given
- Undergraduate level: Biophysical Chemistry I (Kano), Biophysical Chemistry II (Kano), Introduction to Applied Life Science I (Kano and others), Applied Life Science (Kano and others), Analytical Chemistry (Shirai), Laboratory Course in Analytical Chemistry (Shirai, Tsujimura), Laboratory Course in Biophysical Chemistry (Shirai, Tsujimura)

- Graduate level: Bio-Analytical and Physical Chemistry (Kano, Shirai), Bio-Analytical and Physical Chemistry (advanced course) (Kano, Shirai, Tsujimura), Experimental Course of Bio-Analytical and Physical Chemistry (Kano, Shirai, Tsujimura).

B-2. Off-campus teaching etc.

Part-time lecturer

- Kenji Kano: Kyushu University, Department of Science, Bioelectrochemistry, Konan University, Department of Science and Technology, Bioelectrochemistry, Gunma University, Department of Technology, Bioelectrochemistry

B-3. Overseas teaching 1
International students

- International students: Doctoral 1 (Taiwan)