

Joint Studies Programs

As one of the important functions of an inter-university research institute, IMS facilitates joint studies programs for which funds are available to cover the costs of research expenses as well as the travel and accommodation expenses of individuals. Proposals from domestic scientists are reviewed and selected by an interuniversity committee.

(1) Special Projects

A. Molecular Simulation on Structural Change of Tritium-Substituted Polymeric Materials by Decay from Tritium to Helium-3

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 MIZUGUCHI, Tomoko (*Kyoto Inst. Tech.*)
 SAKAI, Wataru (*Kyoto Inst. Tech.*)
 NAKAMURA, Hiroaki (*NIFS*)
 HATANO, Yuji (*Univ. Toyama*)
 SAITO, Seiki (*National Inst. Tech., Kushi College*)
 SAIKI, Toshiharu (*Keio Univ.*)
 OTSUKA, Takao (*RIKEN*)
 KENMOTSU, Takahiro (*Doshisha Univ.*)
 SAITO, Shinji (*IMS*)

Tritium is radioactive hydrogen and is generated not only in nature but also by human activity. Since the range of beta rays emitted from tritium is short, external exposure is not problematic and protection against internal exposure is important. Particularly, damage of macromolecules such as polymeric materials and DNA caused both by beta rays and by the event where substituted tritium decays to helium-3 is regarded

as problems. However, the molecular mechanism of the damage of macromolecules is still an unsolved problem. Effects of radiation on macromolecules are classified into three categories: (1) direct action, (2) indirect action, and (3) decay effect. Although there have been numerous experimental and computer simulation studies on the damage of macromolecules through direct and indirect action, any studies have not been conducted on the damage of macromolecules through decay effect because of the difficulties in extracting the decay effect only.

In this project, we aim to predict the structural change of tritium-substituted macromolecules such as polymeric materials and DNA by a beta decay to helium-3 using molecular dynamics simulations.

Three meetings were held at IMS room 302. Not only the core members (the applicants of this project) but also other related collaborators attended these meetings. The first two meetings were held to discuss course of action for this project on May 24 and October 6, 2017. The third meeting was held to discuss the progress and a future plan of this project on February 22–23, 2018.

(2) Research Symposia

(From Oct. 2017 to Sep. 2018)

Dates	Theme	Chair
Nov. 4, 2017	Cutting-Edge Researches in Coordination Chemistry and Photochemistry	MASAOA, Shigeyuki
Nov. 16–18, 2017	New Developments of Quantum Beams for Materials and Life Sciences	KATOH, Masahiro
Jan. 26–27, 2018	Molecular Science of Batteries: Frontier of Interplay between Theory and Experiment	YAMASHITA, Koichi EHARA, Masahiro
Mar. 4–5, 2018	Stimuli and Responses—What Will Coordination Compounds Mediate?	TSUGE, Kiyoshi MASAOA, Shigeyuki
May 29–30, 2018	Emergence of Novel Chemistry Created by Merging Chemistry and Information Science	ADSCHIRI, Tadafumi YAMAMOTO, Hiroshi
Jun. 1–2, 2018	Symposium on Materials Science for Building New Elemental Strategies	KOBAYASHI, Genki
Jun. 10, 2018	Interplay between Light and Nanomaterials: For the Future of Molecular Science	SAITO, Shinji

PROGRAMS

Jun. 29–30, 2018	Recent Advances in Quantum State Control Using Organic Devices	KAGAWA, Fumitaka YAMAMOTO, Hiroshi
Jul. 8–11, 2018	Fronteir Bioorganization Forum 2018	KATO, Koichi
Jun. 10, 2018	Meeting for Lectures at 58 th Summer School on Molecular Science for Young Scientists	KATO, Fumiaki FURUTANI, Yuji
Aug. 31–Sep. 2, 2018	Synthetic, Biological, and Hybrid Molecular Engines	KINBARA, Kazushi IINO, Ryota

(3) Numbers of Joint Studies Programs

Categories		Oct. 2017–Mar. 2018		Apr. 2018–Sep. 2018		Total		Sum
		Regular	NanoPlat	Regular	NanoPlat	Regular	NanoPlat	
Special Projects		1		2		3		3
Research Symposia		4		5		9		9
Research Symposia for Young Researchers		0		1		1		1
Cooperative Research		38	33	22	31	60	64	124
Use of Facility	Instrument Center		74		77	0	151	151
	Equipment Development Center	1	4	1	5	2	9	11
Use of UVSOR Facility		84	23	98	1	182	24	206
Use of Facility Program of the Computer Center						224*		224*

* from April 2017 to March 2018