

Division of Material Chemistry	Research field	Function Material Chemistry	Lab. ID MC14
Laboratory web site	Takahashi and Kuwabara < http://kohka.ch.t.kanazawa-u.ac.jp/lab2/link.html > Taima < http://www.se.kanazawa-u.ac.jp/rset/about/osc/taima/index.html >		
Research subjects			
TAKAHASHI and KUWABARA: One of the problems that we must urgently work on is to convert light of the sun into chemical energy or electrical energy effectively when we think about future energy and environmental problem. We aim at the development of high durable inverted organic solar cells that we can fabricate in air and by wet process. Further we investigate their photovoltaic properties in detail, and aim at the production of the practical use solar cell. Energy storage is also important as well as energy generation. We focus on hydrogen production from water by electrolysis. We aim to preparation of high electrochemical catalyst for water splitting.			
TAIMA: Solar cells are introduced in various spots as excellent electric energy supplier. In Taima's laboratory, we mainly research the organic solar cell and organic-inorganic hybrid solar cell by dry and wet process. Main target of our research work is to improve the solar cell performance by controlling a molecular orientation and creating a nano-structure. We wish to draw out the potential of organic small molecules by handling the direction and the stack of the π conjugate of molecules.			
KARAKAWA: Solar energy conversion is important technology for this society. An organic solar cell have attractive properties, such as low cost, printed, and flexible fabrications. Our aim is to develop an high performance material applicable to organic solar cell as well as the other organic devices. Design and synthesis of materials are required for the aim. through the work in our lab., you try to get a skill to develop the materials.			
Master/Doctor course: Education policy, curriculum, typical activity in the laboratory			
In a weekly study briefing session, you must report the progress of the study. And also you must introduce the contents of several international journal publication articles to everybody of the laboratory.			
Daily life in the laboratory, etc.			
Events: welcome party (Apr.), camp (July), lab trip (Sep.), IMONIKAI (Potato Soup Party) (Oct.), year-end party (Dec.), farewell party (Mar.) We demand that lab members observe the rule and the manner for healthy academic life.			
Message or comments by the laboratory faculty staffs			
We search for people who loves research works and experiments. We hope that lab members get a great deal of experience in the academic life. Our research work needs a fundamental research skill for handling the direction and the stack of the π conjugate of molecules. You will have a training this kind of skill through the research work in TAIMA's laboratory. you can get a skill to design and organic synthesis for organic semiconductor if you joined in Karakawa's lab. furthermore, you can fabricate organic devices using your own synthesized materials to understand a relationship between chemical structure and its function.			
Recent Master theses in these 3 years (+ more if appropriate)			
year.month	Thesis title (including English translation of Japanese thesis title)		
2017.3	Molecular Orientation Control of Organic Semiconductor based Non-fullerene Organic Solar Cells		
2017.3	Electrochemical characterization of metal oxide-modified electrodes for oxygen evolution from water and mechanistic analysis of the water oxidation		
2017.3	Development of Nanocrystallized Thin Films by Solvent Treatment and its Application to Interpenetrating Heterojunction Organic Solar cells		
2017.3	Influence of reflecting light by back side electrode on performance of inverted organic solar cells		
2017.3	Investigation of Degradation Mechanism for Different Sizes of Organic Cations on Perovskite Solar Cells Fabricated by Solution-process		
2016.3	Photovoltaic properties of inverted organic solar cells containing conjugated oligomers as an electron donor		
2016.3	Orientation control of semiconducting molecular by π - π interaction for improving organic photovoltaic performance		
2016.3	Photovoltaic properties of inverted organic solar cells containing conjugated polymer PTB7 as an electron donor		

2016.3	Electrochemical activity and stability of manganese(IV) oxide-modified electrode for water oxidation
2015.3	Interlayer insertion between organic and electrode layers for improvement of solar cell performance
2015.3	Nano-structure control technique for organic solar cell based on small molecules
2015.3	Planer heterojunction perovskite solar cell fabricated by evaporation method
2015.3	Fabrication and photovoltaic properties of inverted polymer solar cells using flexible substrate
2015.3	Photovoltaic properties of inverted polymer solar cells using conjugated polymers containing carbazole group as electron donating materials
2015.3	Photovoltaic properties of inverted polymer solar cells using novel π -conjugated polymers as electron donating materials
2015.3	Factors affecting photovoltaic properties of inverted polymer solar cells using amine-modified ITO electrodes
2015.3	Photovoltaic properties of inverted polymer solar cells using zinc oxide nanoparticles as electron collection layers
2014.3	Preparation of cobalt oxide modified electrode by electrodeposition and chemical bath deposition and activity evaluation of water oxidation catalyst
2014.3	Photovoltaic properties of inverted polymer solar cells using conjugated polymers containing both groups of dithienosilole and thienopyrrolodione as electron donating materials
2014.3	Mechanistic investigation into the light-soaking effect observed in inverted polymer solar cells using dye-modified ITO electrodes
2014.3	Mechanistic investigation into the light-soaking effect observed in inverted polymer solar cells using chemical bath deposited titanium oxide
2013.3	Photovoltaic properties of inverted polymer solar cells using π -conjugated polymers containing both groups of thienothiophene and benzodithiophene groups as electron donating materials
2012.9	Preparation of cobalt oxide colloid modified electrode with catalytic function of water oxidation
Recent Doctoral theses in these 3 years (+ more if appropriate)	
year.month	Thesis title (including English translation of Japanese thesis title)
2016.9	Investigation of Nanoparticles and Interface Effects on Organometal Halide Perovskite Solar Cells fabricated by Wet Process
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