

(For JSPS Fellow)

Form B-5

Date (日付)

23.07.2013 (Date/Month/Year: 日/月/年)**Activity Report -Science Dialogue Program-**

(サイエンス・ダイアログ事業 実施報告書)

- Fellow's name (講師氏名): Cojocar Ludmila (ID No. P12799)
- Participating school (学校名): Saitama Prefectural Kumagaya Girls' High School
- Date (実施日時): 17. 07. 2013 (Date/Month/Year: 日/月/年)
- Lecture title (講演題目): (in English) Some information about Moldova, France and Third generation solar cells: DSCs-Dye sensitized solar cells
(in Japanese) モルドバとフランスの生活文化および第3世代太陽電池ー色素増感太陽電池ーについて
- Lecture summary (講演概要): Please summary your lecture 200-500 words.

My presentation consisted in three sections. In the first and second parts, I presented my home country – Moldova – and France (where I did my PhD), briefly introduced the traditions, cuisine, the famous people and places. Here, students had a chance to ask questions. After finishing this part, I explained my scientific research in Japan. Firstly, I introducing the main topic of my work: The largest challenge for our global society is to find ways to replace the slowly but inevitably vanishing fossil fuel supplies by renewable resources and, at the same time, avoid negative effects from the current energy system on climate, environment, and health. Solar energy is the foremost power source of our planet and is expected to play a crucial role as a future energy source. The direct conversion of the solar light into electricity is one of their most attractive ways to harvest the solar energy. Although the capacity of solar power generation has been steadily increasing, it is necessary to reduce power generation cost even further to foster the implementation of solar cells. More than 90% of solar cells put in market are silicon-based solar cells. Nonetheless, silicon-based solar cells are hampered by relative high production costs, rendering the power generation uncompetitive with the conventional ones. These limitations have therefore given rise to new concepts – next generation solar cells. In this context, dye sensitized solar cells (DSCs), developed by Prof. Graetzel in 1991, have received sustained attention as one of the most promising photovoltaic technologies, both for their low-cost materials, eco-friendly production processes, transparency, different variety of designs and colors. The concept of the DSCs is similar to the natural process of photosynthesis, were a dye adsorbed onto a mesoporous semiconductor (TiO_2) emulates the roles of chlorophyll and when exposed to sunlight is photoexcited. After light absorption the excited dye molecule injects an electron into the TiO_2 and is itself regenerated by redox electrolyte (I used the video to better

understanding). The main feature of interest of the DSC lies in the cheap and simple manufacture. Finally, in order to confirm that, I showed the students how to prepare one dye-sensitized solar cell using very cheap materials (with every days life examples of applications of each the cells constituents).

- Language used (使用言語): English

- Lecture format (講演形式):

◆Lecture time (講演時間) 70 min (分), Q&A time (質疑応答時間) 20 min (分)

◆Lecture style (ex.: used projector, conducted experiments)

(講演方法 (例: プロジェクター使用による講演、実験・実習の有無など))

Projector, experiments, demonstration material (DSCs)

◆Interpretation (ex.: assistance by accompanied person, provided Japanese explanation by yourself) (通訳 (例: 同行者によるサポート、講師本人による日本語説明))

assistance for japanese translation by accompanied person Prof. Kubo and Prof. Uchida

◆Name and title of accompanied person (同行者 職・氏名)

Professor Takaya Kubo, Professor Satoshi Uchida

◆Other note worthy information (その他特筆すべき事項):

In order to help the students better understand, many demonstrations have been incorporated.

- Impressions and opinions from accompanied person (同行者の方から、本事業に対する意見・感想等がありましたら、お願いいたします。):

最先端研究を実感する機会が少ないなか、今回のような取り組みは、次世代を担う生徒には大変良い機会となったと感じました。また、異文化交流の点でも有意義と感じました。講義の最後に、生徒からの英語によるお礼の言葉は、講師も感動しておりました。