

Form 3

Date (日付)

08/07/2010 (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 (参加外国人研究者氏名): Ashraful Ghani BHUIYAN (ID No. P09075)

Participating school (参加機関(受入学校名)): Ishikawa Prefectural Nanao High School

Date (実施日時): 08/07/2010 (Date/Month/Year:日/月/年) Time: from 14:00 to 16:00

Lecture title (講演題目): (in English) Solar Energy and Solar Cells

(in Japanese) 太陽エネルギーと太陽電池

Lecture summary (講演概要):

Present day civilization and industries are highly dependent on energy. The main sector contributing this huge amount of energy generation is the fossil fuel with limited resources. Some of these resources are only available in few regions of the world. Also the fossil fuel is costly for transmitting in remote areas. Therefore, renewable sources of energy need to be considered seriously for two main reasons: i) to meet the world-wide energy demand and ii) to protect the environment from the destructive burning of fossil and other fuels. Solar energy is the most important renewable source, and convertible into useful form with no transmission cost and environment pollution. In fact, the solar energy resource is much greater than all other renewable and fossil-fuel based energy resources combined. Sunlight reaching the earth's surface is almost 6,000 times the average power consumed by humans. These figures encourage us to look for ways to harness solar energy and convert it into other convenient forms.

Photovoltaic's (PV) is the direct process of converting sunlight into electricity. This process is highly reliable; easy to install; thrives on low operation cost; very safe; generally has no moving parts; while PV systems can be stand-alone, grid-connected, as well as modular. Moreover, this process does not involve any combustion or greenhouse-gas emission, thus making it safe for the environment. The most important drawback of commercially available silicon solar cells is its low conversion efficiency. Searches for new photovoltaic cells with higher efficiency are being conducted all over the world from the beginning of this decade. Attempts have been made to fabricate photovoltaic cells with materials other than silicon and at the same time modifications in design are being carried out to reduce the reflected component of solar energy. Research is going on to fabricate low cost and high efficiency solar cells with improved performance.

Since the audience is mostly high school students, the purpose of this lecture was set mainly to give them an idea about the importance of solar energy and conversion of solar energy into electricity using solar cells. The evolution and future trends of solar cells were also briefly discussed. During presentation some demonstrations were carried out for the students to do a hands-on activity showing solar cells capable of performing useful work.

Language used (使用言語): English and Japanese

Lecture format (講演形式):

○Lecture time (講演時間) ~60 min (分), Q&A time (質疑応答時間) ~20 min (分)

Experimental Demonstrations and Hands-on activity: ~40 min (分)

○Lecture style (examples: used projector, conducted experiments)

(講演方法 (例: プロジェクター使用による講演、プレ実験など))

Used projector for lecture and conducted hands-on activity (experiments)

○Interpreter (example: assistance by host or colleague, provided Japanese explanation by yourself)

(通訳 (例: 受入研究者によるサポート、外国人研究者本人による日本語説明))

Assistance by a Masters student of my host laboratory, mainly provided assistance during hands-on activity (experimental demonstrations).

Name and title of assistant (協力者 職・氏名) (example: host or colleague)

Mr. K. Sasamoto (a 2nd year Masters student of my Host Laboratory)

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

Impressions and opinions of assistant (協力者から本事業に対する意見・感想等がございましたら、お願いいたします。):

近年太陽光発電などの再生エネルギーが注目を浴びている状況にあり、高校生にその技術の基礎が伝わったのではないかと思います。