

Form B-5

Date (日付)

20/09/2012

(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): Gunawan Setia Prihandana \_\_\_\_\_ (ID No. P11362 \_\_\_\_\_)
- Participating school (学校名): Yamanashi Prefectural Yoshida High School
- Date (実施日時): 28/08/2012
- Lecture title (講演題目): MEMS technology in fabrication of Micro-filter for wearable artificial kidney and Micro-needle for brain-machine interface

(in Japanese) 装着型人工腎臓のためのマイクロフィルタとブレインマシン  
インターフェースのためのマイクロニードルの製作におけるMEMS技術

- Lecture summary (講演概要): Please summary your lecture 200-500 words.

Micro-Electro-Mechanical Systems (MEMS) is a technology that miniaturize mechanical and electro-mechanical elements using microfabrication technique. In our project, we focus on fabricating microfilter for wearable artificial kidney and micro needle for brain machine interface (BMI) purposes. In our previous work, we have successfully fabricated microfilter using polyethersulfone (PES) membrane. However, PES membrane is sensitive to biomaterial especially when it was used in blood contact devices. Therefore, in this research we coated the PES membrane with parylene, which seemed almost not possible, to improve the biocompatibility of PES membrane. The results showed that the parylene has been successfully coated on the PES membrane without degrading the filtrating performance of PES membrane. In second work, we have fabricated microneedle from Polydimethylsiloxane (PDMS). In order, to have the PDMS microneedle applicable for BMI, we coated the surface of microneedle with silver. However, the silver was easily peeled off from the PDMS surface. In order to keep the silver layer intact, we were then coated the silver microneedle with parylene. The parylene dimer weight was carefully controlled to produce nanoporous parylene film. Impedance test were conducted on the coated microneedle. The result show that parylene coating on silver needle improve the reliability of silver coating while keeping the impedance low. This means that the microneedle is applicable for BMI purpose.

- Language used (使用言語): English and interpreted by accompanied person (Kazuhiro Uchida)

- Lecture format (講演形式):

◆Lecture time (講演時間) 60 min (分), Q&A time (質疑応答時間) 40 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))

Presentation using projector and conducted diffusion experiments

◆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 by accompanied person

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

Kazuhiro Uchida (Master degree student of Keio University)

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

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- 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。)

I was impressed that so many students ask questions about not only research, but also culture, religion, and Indonesia during discussion time.

It seemed really great challenge for high school students to figure out the research Dr. Gunawan gave in English. And it must have been precious time to feel other country culture. We also had a great time there. Thank you so much.

Kazuhiro Uchida