

(For JSPS Fellow)

Form B-5

Date (日付)

21st Feb 2018 (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): Jaewook Lee (ID No. p16361)
- Participating school (学校名): Shizuoka Kita High School
- Date (実施日時): 19th Feb 2018 (Date/Month/Year: 日/月/年)
- Lecture title (講演題目): A Multi-functional carbon nanomaterials based sensing systems
- Name and title of your company (同行者 職・氏名)
Nozomi Sakai, Undergraduate (B4), Shizuoka University
- Lecture format (講演形式):
 - ◆Lecture time (講演時間) 75 min (分), Q&A time (質疑応答時間) 15 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))
PPT presentation using projector
- Lecture summary (講演概要): Please summary your lecture 200-500 words.

Nanoparticles functionalized carbon nanomaterials (N-fCNM) have been spotlighted due to their multi functionalities and synergic properties such as surface enhanced raman scattering (SERS), magneto optical (MO) effect, plasmon resonance energy transfer (PRET), enhanced electrical conductivity and mechanical property. Based on these kinds of enhanced functionalities, N-fCNM could be used for various sensing applications to detect gases, biomolecules and so on. In this presentation, gold nanoparticles decorated carbon nanotube (Au-CNT) or graphene (Au-GRP) were introduced as optical bio sensing platform. These Au-CNT and Au-GRP have excellent plasmonic property, thus they played a role as optical sensing substrate. Especially, tuberculosis and influenza virus was monitored by using these hybrid nanomaterials, and these diseases were successfully detected with high sensitivity and selectivity. On the other hands, binary nanoparticles; gold/magnetic iron oxide nanoparticles decorated graphene (Au/MNP-GRP) or carbon nanotube (Au/MNP-CNT) have been applied for electrical biosensing platform. These hybrid nanomaterials possess excellent electrical conductivity and magnetic property, so they play a role as sensing channels for detection of the norovirus like particle (NoroVLP) and virus DNA. In both case, excellent limit of detection (LOD) was shown and high specificity against other virus, mismatched DNA or other virus DNA was shown. Therefore, N-fCNM based

biosensing system exhibited excellent detection potential, and this hybrid material could be applied for highly sensitive and selective sensing system universally.

- Overall advice or comments to future participants in the program (今後の講師へのアドバイス):

I think various experiences are important for the students. Lecturer can show general topic to the students for better understanding, but for their future and brainstorming, advanced scientific story is also good for them. And pingpong playing with students is also important. So, not one way presentation but lecturer can toss the questions to the students during presentation.

- Other noteworthy information (その他特筆すべき事項):

N/A

- Impressions and opinions from a company (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。)

今回は通訳として非常に良い経験をすることができました。また、高校生が最先端のテクノロジーに触れる機会は大変貴重なものであると感じました。