

工系3学院学生国際交流基金プログラム

帰国報告書

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所属・研究室・学年: 青木研究室 M1	
派遣先大学・専攻: University of Oxford, Department of Materials	
受入研究室・教員名: Nicole Grobert	
派遣期間: 2019年7月8日～2019年9月5日	
申請カテゴリー: <input checked="" type="checkbox"/> (C1)SERP <input type="checkbox"/> (C2)AOTULE <input type="checkbox"/> (C3-a)部局間協定校 <input type="checkbox"/> (C3-b)全学協定校 <input type="checkbox"/> (C4)その他	
研究(プロジェクト)題目: Spin Coating Deposition of Carbon Nanotubes in Acrylate Polymer Matrix	

- A) 帰国後1か月以内に工系国際連携室宛 (ko.intl@jim.titech.ac.jp) にMS Wordファイルにて提出ください。
- B) SERP・AOTULEで派遣された場合は、受入教員の評価書も添付して下さい。
- C) この表紙を含まず、ページ数は2～4ページ、ファイルサイズは3MB以内としてください。
- D) 研究室や宿舎内の様子の写真、図表、イラスト、滞在中のその他の写真などは挿入可です。ただし、それらを掲載する際には簡単な説明を加えて下さい。
- E) 提出された報告書の2ページ目以降を工系のホームページに掲載いたします。また、別途、学内広報誌「東工大クロニクル」の執筆をお願いすることがあります。

報告書必須記載事項

1. 派遣大学の概要(所在地、創立、規模など)
2. 留学準備など(就職活動、修士・博士論文などとの兼ね合いを含め、修了までの計画をどう立てたか、留学先大学の指導教員/所属研究室の見つけ方、ビザ取得の有無など)
3. 所属研究室での研究概要とその経過や成果、課題など
4. 所属研究室内外の活動・体験(日常生活・余暇に行った事など)
5. 留学先での住居(寮、ホームステイ等)、探し方、申し込み方法、ルームメイトなど)
6. 留学費用(渡航費、生活費、住居費、保険料)など
7. 今回の留学から得られたもの、後輩へのメッセージ、感想、意見、要望
8. その他 *任意 (留学先で困ったこと/帰国後の進路(就職・進学・長期留学))

東京工業大学 工系3学院学生国際交流基金
帰国報告書

派遣年月:2019年7月~9月

氏 名: Wu Han

所 属:物質理工学院 応用化学系 エネルギーコース

派 遣 先:University of Oxford

1. About the university

University of Oxford is one of the leading universities in the world. Established in 1906, making it one of the oldest university in the world. Oxford has educated many notable alumni, including prime ministers and heads of government as well as Nobel Prize winners and Turing Award winners.

2. About application and preparation

My application and preparation for this program span from January to May, when I was a M1 student. And as I'm enrolled in September so I didn't have to worry about job hunting at that period. I stayed there for 2 months from July to early September. During summer time there are lots of professors who would take vacations so we don't usually get to the group we wanted to be in. I was a member in group of Nicole Grobert, and we had a skype interview before we went there (But relax, it's not a serious one). Unlike Japanese, I have to apply for a short term study visa go get there, as well as a certificate called ATAS due to the sensitive major which takes more than 20 working days to get it. The academic secretary will help you with it.

3. About my research

The major focus of our group is nanotubes by design, including carbon nanotubes and boron nitride nanotubes. My project focused on whether we can improve electrical properties of polymer by adding carbon nanotubes (CNTs). Firstly, we synthesized multiwall carbon nanotubes (MWCNTs) by aerosol-assisted chemical vapour deposition (AACVD). Then SEM was done to analyze the morphology of CNTs synthesized.

Then we integrated various proportions of both single-walled and multi-walled CNTs into diacrylate (TPGDA), then use spin-coating to deposit carbon nanotubes (CNTs)/acrylate solution on flexible PET substrate. Polymerization of diacrylates was achieved by UV. FTIR tests were done to check the polymerization status. Both SEM and optical microscopy were tried also to

characterize the dispersion.

After successfully dispersed CNTs and cured the polymer, different concentrations of CNTsacrylate solutions were deposited on substrates to see the electrical properties among various concentrations. For samples to run electrical tests, electrodes (coating of copper by evaporation) were put both on substrate prior to spin coating and after polymerization of monomers to form capacitors. Capacitance and impedance of those thin films were tested under different frequencies.



Our lab and the office

4. About our lab life

Our lab lies at a place called Begbroke Science Park several kilometers away from the department, and there's a minibus we can take for free. In Nicole's group, we have lunch together every day. People usually talk about recent plans, or things going on around the world, or exchange cultural experience because we are from all over the world, or just some random interesting topics. It is a really lovely group. And we also had a barbecue which was really fun.

5. About accommodation

One of the colleges provides us an accommodation with 25 pounds/day. It's really convenient with about 15-minutes-walk from downtown but a little bit expensive. The conditions are pretty good, we share shower room and toilets, as well as kitchen, and we have scouts who do the cleaning so we

don't have to do it ourselves.



Inside and outside the dorm

6. About living expenses

The cheapest round flight ticket from Tokyo to London is more than 100,000JPY. There are buses can get you directly to Oxford downtown from whichever airport in London (Heathrow or Gatwick is more convenient).

The living fee in Oxford is rather high, comparing to other towns with similar scale as Oxford, and we also hear complaints from local students as well. For us, the rent is 750-800 pounds per month, local students who rent and share a house may only pay around 400 pounds per month. For daily food and stuff, I mostly just buy fast food from supermarket or eat at Begbroke's cafeteria, with around 400-500 pounds cost per month. Fruit and vegetables can be really cheap sometimes, but still with good quality, for instance, 60 pence for four nectarines or 2 pounds for 1lb strawberry or cherry.

7. About future plans

People I met in Oxford are all nice, smart, hardworking and fun. When they work, they work seriously; when they relax, they just enjoy it.

This experience actually let me seriously consider about whether to do a PhD or not after master graduation. But no matter what my choice would be, I would take this as an incentive to keep working hard and try my best in everything I do.