

Synthesis and Characterisation of Macrocyclic Conjugated Polymers

Benjamin J. Lidster

Institution: Tokyo Institute of Technology

Department: Department of Organic and Polymeric Materials

Host: Prof. Y. Tezuka

Duration: September 2012 to January 2013

Prof. Y. Tezuka, Tokyo Institute of Technology, Japan, is a major name in the synthesis, characterisation and application of polymers with complex topologies and I had the pleasure of joining his group for a short period in the autumn of 2012. My research whilst at the Tokyo Institute of Technology focused on obtaining purely cyclic polymers consisting of a fully conjugated backbone, which have yet to be reported. These polymers are of significant interest due to their interaction with visible light and for the movement of electrons within the polymer structure. Application of these conjugated cyclic polymers in organic light emitting diodes (OLEDs) and organic photovoltaic cells (OPVs) could lead to the possibility of improved device performance, in comparison with the linear polymer counterparts. Whilst in the Japan a successful method was developed to synthesise and purify these highly sought cyclic polymers and the project is currently being further explored in the group of Prof. M. Turner at The University of Manchester, U.K., with particular interest into the optical and electronic properties.

Since the group of Prof. Y. Tezuka specialises in the synthesis and characterisation of cyclic polymers the laboratory was well equipped for me to conduct my research and the expertise within the group provided me with invaluable knowledge, particularly in respect to the characterisation of my cyclic polymers. The students and assistant professor within the group were extremely helpful, allowing me to settle quickly into working in the laboratory and dealing with everyday issues whilst conducting my research. Outside of work the students were further welcoming with inviting me to restaurants and showing me places within Tokyo, which I probably wouldn't have visited or even known about. Before my arrival in Japan the Tokyo Institute of Technology had kindly arranged my accommodation for me at the International Guest House, which was within 10 minutes of the main university campus. During my stay in Japan I was also able to attend the 9th SPSJ International Polymer Conference in Kobe where I was able to meet with other polymer chemists from within Japan as well as from around the world.

Being in Tokyo meant there was plenty to see and do and transport by train was very easy and efficient, with most of the city being readily accessible within one hour. Despite hearing that Tokyo could be an expensive place to live, I found that the transport, food and museums/sights all to be reasonably priced and affordable. Outside of Tokyo I got the chance to visit other major cities including Kyoto, Kobe, Osaka and Nagoya which were all reached within 3 hours on the Shinkansen (bullet train). All of these are highly recommended a visit, in particular Osaka as well as Kyoto for its many temples.