



# 第171回触媒化学研究センター談話会

---

演 題 :

***Langmuir-Blodgett* Films of Fatty Acid / Nanoparticle Composites  
Studied by Sum Frequency Generation Spectroscopy**

講演者 : **Jasper Holman 氏**

(Department of Chemistry, University of Cambridge, UK)

日 時 : 2004年6月3日 (木) 15:00-16:30

会 場 : 北海道大学創成科学研究棟 4階-214室

要 旨 : The *Langmuir-Blodgett* technique is a highly versatile method for preparing organic thin films incorporating semiconductor nanoparticles with nanometre precision which can be used for molecular electronics and photovoltaic devices. With the molecular precision comes the need for techniques able to characterize the structure of the films on a molecular level. The non-linear optical technique of Sum Frequency Generation (SFG) is a promising candidate because of its high interface specificity and sensitivity to conformational order. However, while SFG of monolayers is well established, SFG of multilayers is a more complicated phenomenon and will be explained in detail. One of the complications is a thin film interference effect which has been fully analyzed and quantified. With this new understanding it is possible to determine the spatial separation between a SFG active layer and a metal substrate which also provides a means for estimating film thickness.

Furthermore through the combination of per-protonated and per-deuterated layers it is shown to be possible to study individual layers, which can be located anywhere within the film. This is applied to the investigation of nanoparticle-induced structural changes within the multilayer film. It will be demonstrated that, because of the unique way SFG probes the film, it provides valuable information that cannot be obtained by conventional surface characterization methods. SFG studies have been carried out using both a narrowband nanosecond and a broadband femtosecond SFG system and a brief comparison is presented.

なお、Holman氏は現在、日本学術振興会(JSPS)の外国人特別研究員として北大に滞在している。

《連絡先》 北大触媒化学研究センター 界面分子化学分野

大澤雅俊 (TEL: 011-706-9123)