

Boronic Acids: Recognition, Sensing and Assembly

Prof. Tony D. James

University of Bath (UK)



Abstract :

The ability to monitor analytes within physiological, environmental and industrial scenarios is of prime importance. Since recognition events occur on a molecular level, gathering and processing the information poses a fundamental challenge. Therefore robust chemical molecular sensors “chemosensors” with the capacity to detect chosen molecules selectively and signal this presence continue to attract considerable attention. Real-time monitoring of saccharides is of particular interest, such as D-glucose in blood. Towards that end the covalent coupling interaction between boronic acids and saccharides has been exploited with some success to monitor the presence of such saccharides. The boronic acid Lewis acid-base interaction is also suitable for the capture and recognition of anions. Anions are involved in fundamental processes in all living things. Our aim is to mimic nature’s level of sophistication in designing and producing chemosensors capable of determining the concentration of a target species such as: saccharides, glycated proteins, anions and reactive oxygen/nitrogen species (ROS/RNS) in any medium.

As well as sensors for saccharides, anions and ROS/RNS the presentation will cover the use of boronic acid based receptors for the analysis of protein glycation. Protein glycation is an important biomarker for age-related disorders such as diabetes and Alzheimer’s disease. This process whereby reducing saccharides react with amino groups of proteins ultimately leads to the formation of complex and stable advanced glycation endproducts (AGEs). Glycation compromises proteins throughout the body resulting in many diabetes related complications (e.g., nerve damage, heart attack, and blindness). Glycated proteins and their resulting AGE products are also key elements in the pathology of Alzheimer’s disease (AD).

Date: September 8, 2017 (14:00-15:00)

Place: IIS, As305

問い合わせ先: 南 豪 (物質・環境系部門)
tminami@iis.u-tokyo.ac.jp (内線: 56364)