



Contribution ID: 131

Type: Poster

The electronic structure of S-layer proteins from *Lactobacillus brevis*

Bacterial S-layers present an interesting composite material to study. S-layers are crystalline outer-sheaths of some bacteria that consist of a number of proteins. Unit cells are essentially two-dimensional with lattice parameters that are in the order of nanometers. This study attempts to detail the electronic structure from one particular bacterium, *Lactobacillus brevis*. *L. brevis* is a rod-shaped gram-positive bacterium from the family of lactic acid bacteria, *Lactobacillaceae*, that are involved in the fermentation process creating CO₂ and lactic acid. Clearly the surface of such bacteria must play a huge role in such heterogeneous fermentation processes. The valence electronic structure of the S-layer of *L. brevis* is determined using synchrotron-based photoelectron spectroscopy and soft x-ray absorption spectroscopy. Spectra are compared to experimental work on amino-acids and S-layers of *Bacillus sphaericus*. While indeed possible to identify energy levels with those of natural amino-acids, distinct energy shifts are observed which cannot be reconciled using such simple comparisons. Furthermore a strong nitrogen signal observed in both the occupied and unoccupied energy levels suggests that the *L. brevis* protein is amine-terminated on the S-layer surface. The presence of amine termination suggests decarboxylase activity related to the fermentation process.

Primary authors: Dr STAMPFL, Anton (Australian Nuclear Science and Technology Organisation); Dr GRAHAM, Susan (ANSTO); CLEMENTS, Richard; Dr ASQUITH, Nicola (ANSTO); Dr KARYN, Wilde (ANSTO); Prof. HWU, Yeukuang (Academia Sinica)

Presenter: Dr STAMPFL, Anton (Australian Nuclear Science and Technology Organisation)

Session Classification: Poster Session - Main Hall Tuesday

Track Classification: Biosurfaces, Interfaces and Nanostructures