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Type: Poster

Validating residues influence on peptide/graphene interface and VOCs sensing performance using Near Edge X-Ray Absorption Fine Structure (NEXAFS) spectroscopy

In a biosensing device, the sensing performance is governed by the biotic/abiotic interface, where the biorecognition element (BRE) needs to interact with both the abiotic transducer and the target of interest to trigger the desired response. The morphology of the BRE at the biotic/abiotic surface is a result of numerous interactions that strongly influence which conformation the BRE will assume on the substrate surface. Presumably, this conformation impacts target/BRE interactions and, therefore, subsequent responses in the transducer, ultimately dictating sensor performance. As such, the biotic/abiotic interface is the most critical part of biosensor development because a well-engineered interface will be responsible for the biosensor's stability, sensitivity, and accuracy. Proper interface characterization is challenging due to all possible physicochemical interactions and the lack of atomic-scale characterization tools that can readily probe biological materials. Still, it is mandatory to understand their role to make the BREs adopt a specific orientation after the attachment.

In this presentation, NEXAFS spectroscopy to investigate the bio interface between peptide sequences with known binding affinity to volatile organic compounds (VOCs) and graphene. We modified the original sequences designed for VOC binding by replacing predicted key amino acids with non-interacting moieties to probe sequence-dependent sensing performance. Furthermore, NEXAFS was performed after dosing with VOCs, providing key insights into how morphological/orientation changes occur as a function of the peptide sequence. Overall, this work strongly indicates that NEXAFS is an ideal tool to correlate molecular alignment and performance of functionalized surfaces, contributing to the development of biofunctionalized sensors and devices.

Level of Expertise

Student

Presenter Gender

Man

Pronouns

Do you intend to attend UM2022

In person - Melbourne

Students Only - if available would you be interested in student travel funding

Yes

Students Only –Do you wish to take part in the Student Poster Slam

Yes

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Yes

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