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Biochemical Interaction of Few Layer Black Phosphorus with Microbial Cells Using Synchrotron macro- ATR-FTIR

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In the fight against drug resistant pathogenic bacterial and fungal cells, low dimensional materials have been shown as a promising form of alternative treatment method. Specifically, few-layer black phosphorus (BP) has demonstrated its effectiveness against a wide range of pathogenic bacteria and fungal cells. In this work, the complex biochemical interaction of BP with a series of microbial cells is investigated to provide a greater understanding of the antimicrobial mechanism. Synchrotron macro-attenuated total reflection-Fourier transform infrared (ATR-FTIR) spectroscopy is used to elucidate the chemical changes occurring outside and within the cell of interest after exposure to BP nanoflakes. The ATR-FTIR data, coupled with advanced, high-resolution microscopy, reveals noticeable differences to the polysaccharide and nucleic acid spectral maps, along with changes in amide protein structure when compared to untreated cells. This study provides a greater insight into the biochemical interaction of BP nanoflakes with microbial cells is given, allowing for a better understanding of the antimicrobial mechanism of action.

Presenter Gender

Non-Binary

Do you wish to take part in the Student Poster Slam

Condition of submission

Yes

Students Only - Are you interested in AINSE student funding

Level of Expertise

Student

Pronouns

They/Them

Which facility did you use for your research

Primary author: SHAW, Zoe (School of Engineering, RMIT University)

Co-authors: Mr CHEESEMAM, Samuel (School of Applied Sciences, RMIT University); HUANG, Louisa (School of Applied Sciences, RMIT University); PENMAN, Rowan (School of Applied Sciences, RMIT University); BRYANT, Saffron (School of Applied Sciences, RMIT University); BRYANT, Gary (Centre for Molecular and Nanoscale Physics, School of Applied Sciences, RMIT University); CHRISTOFFERSON, Andrew (School of Applied Sciences, RMIT University); ORRELL-TRIGG, Rebecca (School of Applied Sciences, RMIT University); DEKIWADIA, Chaitali (RMIT Microscopy and Microanalysis Facility); TRUONG, Vi Khanh (School of Science, RMIT University); VONGSVIVUT, Jitraporn (Pimm) (Australian Synchrotron); WALIA, Sumeet (School of Engineering, RMIT University); ELBOURNE, Aaron (School of Applied Sciences, RMIT University)

Presenter: SHAW, Zoe (School of Engineering, RMIT University)

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