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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.

### **Level of Expertise**

Student

### **Presenter Gender**

Non-Binary

### **Pronouns**

They/Them

### **Which facility did you use for your research**

Australian Synchrotron

### **Students Only - Are you interested in AINSE student funding**

### **Do you wish to take part in the Student Poster Slam**

### **Condition of submission**

Yes

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