



Wolfson Department of Chemical Engineering Seminar

Monday, Januray 5th, 2025 at 13:30

Room 6

Characterization and property enhancement in multifunctional materials

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Multifunctional materials play a major role in transducing and sensing applications, for example piezoelectric materials allowing electromechanical energy and information conversion, leading to applications such as ultrasound and sonar imaging. Our lab deals with such materials with the goal of bringing new multifunctionality through composites or usage of overlooked properties. For example, GaN as a semiconducting material received its fame due to excellent electronic and optoelectronic properties. However, it also possesses piezoelectric properties – thus opening up a path for electromechanical semiconductor applications (sometimes called piezotronics).

In this seminar I will share some of our recent work in this field. In the first part, focusing on the ability to enhance/control the piezoelectricity of GaN through nanostructuring. AFM based electromechanical measurements were used to quantify the conductivity and piezoelectricity as a function of etching and doping degree. The role of crystalline defects will be discussed in particular. Next, I will introduce the concept of magnetoelectric composite coupling – a combination of piezoelectric and magnetostrictive materials. In particular, our work on characterization and modelling of magnetoelectric devices in higher order bending modes and their usage for power transfer and sensing.

Refreshments will be served at 13:15.