Physics
AT QUEENS COLLEGE

Colloquium Notice

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Microscale ZnO with Controllable Crystal Morphology as a Platform to Study Antibacterial Action on Staphylococcus Aureus

Nanoscale ZnO particles are known to inhibit the growth of bacteria. The fundamental mechanisms driving this process, however, are not completely understood. While there are many contributing factors to consider, we hypothesize that the antimicrobial action is most fundamentally derived from the ZnO surface and its interaction with growth media and the bacteria's extracellular material. In this work, we implement minimum inhibition concentration and novel comparative assays to evaluate the antibacterial activity of ZnO microcrystals produced by us using a hydrothermal chemical growth method. The samples were synthesized in the range of sizes from 1μm to 5μm with varying abundances of surfaces with different polarities. This approach prevents the ZnO particles to be internalized by the bacterial cells with diameters ca. 500 nm, thus allowing one to study correlations between overall surface polarity and antibacterial action. These experiments were performed in conjunction with optoelectronic studies of ZnO crystals (photoluminescence, surface photovoltage) to characterize electronic structure and dominant charge transport mechanisms as fundamental phenomena, which could potentially govern the processes leading to an antibacterial behavior in our samples. We report on the results of these comparative studies relating antibacterial properties with surface morphology and electronic behavior.

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Starts at 12:15 PM
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