Detection of Single Particles in Biosensors for Cancer Applications

Abstract:

During the last decades, single particle detection have opened a novel sight for doing electrochemistry. The possibility of detecting single biomolecules, differentiate between a single cancer cell in presence of healthy cells and detecting single viruses are envisioning steps toward the development of biosensor and novel techniques for better understanding of a human's machinery. More recently, advances in single metal detection of nanoparticles, organic particles and oxide particles have been achieved. In this research, zero valent iron nanoparticles (nZVI) prompt to oxidation in aqueous media, are detected and characterized by electrochemical techniques using single particle approach. ZVI particles are known to be ion sequesters and are used for environmental remediation. Due to this behavior the nZVI particles are a promising alternative to heavy metal poisoning. Because cancer cells are known to have a higher iron requirement than healthy cells, this fundamental research elucidates how an iron-based cancer biosensor would work. Emulsion oil droplet experiment results can be used to forecast the cell behavior in presence of nZVI. Applications for fundamentally drifted experiments aim to elucidate and characterize novel nanomaterials that are currently used.