

PROJECT DESCRIPTION

The project entails qualitative and quantitative determination of organic compounds in waste water using molecularly imprinted polymers, Surface Enhanced Raman scattering and paper based microfluidics optical screening devices and molecular modelling. The main focus of this project will be to tackle challenges that are faced by our local industries such as the usage of poor water quality, and also the utilization of the academic skills and resources in training local students. This project addresses challenges experienced when using techniques such as Solid Phase Extraction (SPE) and Solid Phase Micro extraction (SPME) for extraction and pre-concentration. In this project SPE sorbents that are selective and thermally stable are employed. Such sorbents allow the removal of a target group of pollutants prior to their chromatographic quantification. Further studies are conducted to develop a rapid and accurate gold nanoparticle (AuNP)-based SERS and Multiplex microfluidic paper-based analytical devices (μPADs) sensors with high potential to rapidly detect toxins and organic pollutants in water with high sensitivity, and these sensors are expected to play an increasingly significant role in environmental monitoring.

RESEARCH LEADERS

Dr PS Mdluli

His research passion and interest is ranging from project that deal with synthesis and computational simulation of metal nanoparticles with an aim of understanding the influence of morphology on the application gold and other metal nanoparticles as colorimetric sensors. He has more than 8 years of experience employed as Senior Scientist at Mintek. At Mintek, his roles were mainly on the design and execution of a research strategy to develop point-of-care lateral flow diagnostic kit for tuberculosis, malaria, rift valley fever and other animal and human health related diseases. Part of his role also involved the supervision of post graduate students which were involved in nanoscience and nanotechnology. He has been trained at Diagnostic Consultation and Biodot in California (USA) where an explicit training on the development and commercialization of the in vitro diagnostic devices was offered. He has been also involved with MSc programme in Nanoscience offered by University of the Western Cape, where he has been conducting lectures in Nanobiotechnology which involves nanomedicine and nanodiagnosics.

Mr LM Madikizela

His research focus area is on the analysis of pollutants in the environment. The research involves synthesis and characterization of molecularly imprinted polymers and their applications as selective sorbents for the adsorption of organics from various water matrices. Various techniques such as NMR, FTIR, TGA, BET, XRD, SEM, etc are employed in characterization. Density Functional Theory and Molecular Dynamics are employed for the understanding of monomer-template interaction. He is currently a KZN ChromSA representative (July 2015 to July 2018). He is also serving in Chemistry Advisory Boards at Mangosuthu University of Technology.

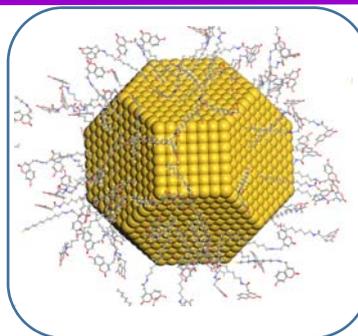
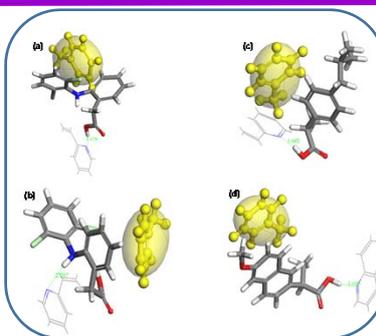
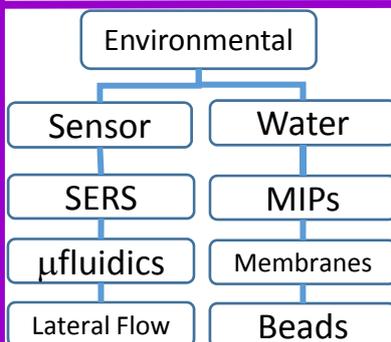


Dr PS Mdluli



Mr LM Madikizela

CURRENT RESEARCH ACTIVITIES



OUR GROUP WEBSITE

Information about other research projects, collaborators and current Post Graduate students can be found in our website by scanning the following QR code or clicking the URL link.



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