

## Department of Chemistry

### Departmental Seminar Series

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You are cordially invited to an online lecture on the PhD thesis of



**Mr. Elias Aphone**

Department of Chemistry, University of Pretoria and UNISA

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**Date:** Wednesday, 6 May 2020  
**Time:** 11:00  
**Join with Google Meet:** <https://connect.up.ac.za/https/meet.google.com/fim-hvew-shx>  
**Enquiries:** Prof. Liezel van der Merwe, [liezel.vandermerwe@up.ac.za](mailto:liezel.vandermerwe@up.ac.za)

#### **Silica nanoparticles from South African coal fly ash derived sodium silicate solutions**

Silica nanoparticles are one of the most frequently used inorganic support materials for heterogeneous catalyst immobilization. Their good sorption properties provided by their high surface area and porous structure, tailor their suitability as catalyst support. The presence of high concentrations of hydroxyl groups at their surface facilitates catalyst attachment. Commercially prepared silica nanoparticles such as MCM-41 and SBA-15 are frequently used support materials. The production and application of ultra-pure silica nanoparticles produced from coal fly ash (CFA), as alternative catalyst support to the commercial silica support in the oxidation of veratryl alcohol, was investigated in this study. The high silicon content of CFA was considered suitable for the preparation of sodium silicate solutions and subsequent synthesis of silica nanoparticles. This work successfully demonstrates the synthesis of amorphous mesoporous silica nanoparticles from sodium silicate solutions, which were prepared from a South African classified coal fly ash. It further validates the application of the silica nanoparticles as catalyst support in heterogeneous catalysis, proving that these products can potentially be employed as alternative to commercially available mesoporous silica.