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Synthesis and characterization metal chalcogenide nanocrystals used as active layers in solar cells

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Abstract content
   (Max 300 words)

Metal chalcogenide nanomaterials have been the most intensively studied because of their quantum confinement and photoconductivity. Their properties are exploited for various applications including photovoltaic cells, catalytic activity and biological sensors. This project aims to synthesize copper selenide, quantum dots (QDs) using “one pot” colloidal and microwave assisted methods for applications in photovoltaics. Those two routes of synthesis will be used to prepare copper indium selenide and copper indium gallium selenide nanoparticles based on the yield and properties of copper selenide nanocrystals. The nanocrystals are analyzed by X-ray diffraction (XRD) and their solutions in chloroform are analyzed by UV-Visible spectroscopy (UV-Vis), Fluorescence spectroscopy (PL), and Transmission electron microscopy (TEM). Electrical properties are investigated via current and voltage measurement. A large blue shift of synthesized materials is observed indicating that the nanoparticles are relatively small. TEM images show small size particles with defined shapes and XRD spectra show that the particles are crystalline in specific phases.

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Yes

Level for award
 (Hons, MSc,
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PhD

Main supervisor (name and email)
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Nosipho Moloto

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Yes

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