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Green synthesis of ZnO nanoparticles and the investigation of their physical properties

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ZnO is a wide band-gap semiconductor "˜3.7 eV" at room temperature with a wurtzite crystal structure. It has attracted a significant interest worldwide above its initial potentiality as the ideal candidate for blue-UV light emitting diodes applications. Its multifunctionality as a transparent conducting oxide, effective piezoelectric, a selective gas sensor and an efficient catalyst support among others, has made it as one of the most studied simple oxide in its nano form in the modern era.
Nano-scaled ZnO has been synthesized in a plethora of shapes. A rich variety of physical and chemical methodologies were used to synthesize undoped or doped ZnO. The synthesis of ZnO nanoparticles by conventional physical and chemical methods has been reported to have adverse effects such as critical conditions of temperature and pressure, expensive chemicals, long reflux time of reaction and toxic byproducts. The green synthesis approaches which are based on using biogenic processes, reduce the pollution risk at source level and hence avoids the waste products that need to be treated or cleaned up after it has been formed.
This work reports on the synthesis and the main physical properties of nano-scaled pure ZnO particles synthesized by a completely green process using Aspalathus Linearis' natural extract of as an effective chelating agent without addition of any acidic or basic medium.

Summary

Zinc oxide (ZnO) nanoparticles were 'green' synthesized by using the natural extract of Aspalathus Linearis as a chelating agent to reduce the Zn metal salt. Following this, the physical properties of the ZnO nanoparticles were studied using different characterization techniques such as XRD, HRTEM, SEM, FTIR and DSC/TGA.

Apply to be
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Yes

Level for award
 (Hons, MSc,
   PhD, N/A)?

MSc

Main supervisor (name and email)
and his / her institution

Prof. Malik Maaza, maaza@tlabs.ac.za, iThemba LABS

Would you like to
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Yes

Primary author: Ms NETHAVHANANI, Takalani (University of the Western Cape)

Co-authors: Dr DIALLO, Abdoulaye (iThemba LABS); Prof. MADJOE, Reginaldt (University of the Western Cape)

Presenter: Ms NETHAVHANANI, Takalani (University of the Western Cape)

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