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PHYTO-MEDIATED SYNTHESIS AND PHOTOCATALYTIC ACTIVITY OF NANOPARTICLES USING AQUEOUS EXTRACT OF BROCCOLI

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The intense interest in the study of nanoparticles arose by virtue of their unique physiochemical properties viz. mechanical, optical, electronic, magnetic, antimicrobial and catalytic. Among the metal oxide nanoparticles, CaO although rarely studied, has enormous use in the fields of catalysis, antimicrobial, detection, therapeutic and microelectronics. The green chemistry route is a pollution free synthetic method that employed the use of precursors, water and aqueous plant extract. It offers an alternative to chemical synthesis approach. In this work, we have synthesized CaO nanoparticles via green chemistry, using aqueous extract of broccoli as the capping and reducing agent and a combination of different calcium salts ($Ca(NO_3)_2$, $CaSO_4$, $CaCl_2$. $2H_2O$). The $Ca(OH)_2$ obtained were annealed at 750 °C to give CaO nanoparticles represented as C1, C2 and C3 from nitrite, sulphate and chloride sources sequentially. The nanoparticles were further investigated for their photocatalytic activities using bromocresol green (BG) and bromophenol blue (BP) as organic dyes and UV light as a radiation source. All the samples; C1, C2 and C3 exhibit significant degradation abilities against BG and BP. C2 and C3 revealed greater extent of photocatalytic degradation as they almost completely decolourised the organic dyes after a 180 mins of exposure to UV light. The degradation efficiency was found to be 73, 75 and 78% for C1, C2 and C3 respectively.

Biography

Jejenija Osuntokun obtained his PhD in Inorganic chemistry from University of Fort Hare, South Africa. He has wealth of experience in synthesis and characterization of metal complexes and subsequent use as a precursor for the synthesis of metal sulphide nanoparticles. He has worked on the synthesis of nanocomposite using synthesized metal sulphide nanoparticles as nano fillers. Presently, he is a Postdoctoral research fellow at North-west University in South Africa and his research focus is on the preparation of metal oxide nanoparticles via green chemistry. These metal oxides are further used for photocatalytic degradation of dyes with the ultimate application in environmental remediation especially in water purification.

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