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# Green Synthesis of Zinc Oxide Nanoparticles for Water Remediation

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**Abstract :** A novel green method for water remediation to remove arsenic (III) ions using Zinc oxide nanoparticle embedded in activated silica (ZnO-NPs-AS-*Eo)* is synthesized from leaf extract of *Emblica officinalis*.SEM, XRD EDAX and FT-IR analysis shows that the adsorbent is in rod shape with an average size of 16 nm with elemental composition of zinc, oxygen and silica elements with primary amine at about 3550-3300 $cm^{-1}$. The same acts as a stabilizer, promoter, reducing and capping agent to form (ZnO-NPs-AS-*Eo)* and prevents from agglomeration. The percentage of As (III) removal was very significantly from 85% to 96.7% at a concentration of .02N with 2.5g adsorbent dosage at a pH of 5 with a contact time of 60 min at an agitation speed of 300rpm. Results showed that the adsorption process by ZnO-NPs-AS-*Eo*was better represented by the Langmuir equation compared to the Freundlich isotherm, Tempkin equations and BET isotherm. Pseudo-second-order kinetics model provides a good correlation for the adsorption of As (III) on ZnO-NPs-AS-*Eo* and it also suggests that the adsorption is chemisorptions.

**KeyWords**: Zinc oxide Nanoparticles; Activated Silica; Isotherm and Kinetics.

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