

## Eco-Friendly In-Situ Synthesis of Ag<sub>2</sub>O Nanoparticles in Vesicles

Technology Domain: Environmental Technology

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Status (Patent/TRL): Patent Pending / TRL 4

### Technology Summary:

This invention details a pioneering, eco-friendly method for synthesizing silver oxide nanoparticles (Ag<sub>2</sub>O NPs) directly within naphthalene di-imide (NDI)-based vesicles under ambient conditions, circumventing the need for harsh chemicals, high temperatures, or complex equipment typically associated with nanoparticle synthesis.

The process involves simply adding silver nitrate (AgNO<sub>3</sub>) solution to an aqueous NDI vesicular solution, where the Ag<sub>2</sub>O NPs form *in-situ* and are stabilized by the vesicles. This breakthrough offers a sustainable, cost-effective, and scalable approach to produce highly stable Ag<sub>2</sub>O NPs, which, due to their small size and the composite vesicular structure, demonstrate exceptional efficiency as photocatalysts for degrading organic pollutants like Malachite green in wastewater, promising significant advancements in environmental remediation and potentially other biomedical applications.

