

## Reusable NiO–Ferricyanide Nanocomposite Redox Mediator for Biosensors

Technology Domain: Nanotechnology

Patent Application Number: 202441042587

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

### Technology Summary:

This invention introduces a metal oxide nanoparticle-based ferricyanide nanocomposite as a novel, reusable redox mediator for biosensors. Traditionally, ferricyanide is used in liquid form, limiting reusability. The key inventive feature is the electrochemical synthesis of a solid film of nickel oxide nanoparticles and potassium ferricyanide directly on a carbon black-modified glassy carbon electrode (GCE).

This solid-film approach allows the redox mediator to be reused, addressing a major limitation in developing point-of-care electrochemical sensors. The invention demonstrates successful synthesis and characterization using techniques like FT-IR, FE-SEM, and cyclic voltammetry. Results show the complex's stability and effectiveness, even after 50 cycles, without leaching. The technology was successfully applied for Vitamin D3 detection by immobilizing anti-Vitamin D3 antibodies on L-cysteine modified gold nanoparticles coated on the electrode, showing a clear current decrease upon antigen binding. This technology has significant potential for developing stable and reusable electrochemical biosensors.

