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# Detection of Selenium and Nickel Metal Ion in Water Using $Mn_3O_4$-Cn-Modified Electrode

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## EDITORIAL

The $Mn_3O_4$-Cn electrode's design and application for simultaneous detection of selenium and nickel in water. The developed electrode can be utilised as a portable electrochemical device to assess Se (IV) and Ni (II) levels in affected areas. With 0.1 M Phosphate Buffer Saline (PBS) and 5 mM Fe $(CN)_6$ as the supporting electrolyte, the best results are obtained. The number of cycle repetitions and the scan rate have a significant impact on peak shape and intensity. Because heavy metals are nonbiodegradable, they pose a significant risk to species in the environment. Metal ions in diverse mediums are analysed using systematic processes at a number of research laboratories. Atomic absorption spectrometry, atomic fluorescence spectrometry, high-pressure liquid chromatography, gas chromatography, and flow injection analysis are all part of this process. These methods each have their own set of disadvantages. Low cost, on-site availability, stability, reproducibility, accuracy, and detection of multiple ions are all advantages of electrochemical detection of metal ions.

Metal ions in diverse mediums are analysed using systematic processes at a number of research laboratories. Atomic absorption spectrometry, atomic fluorescence spectrometry, high-pressure liquid chromatography, gas chromatography, and flow injection analysis are all part of this process. These methods each have their own set of disadvantages. Low cost, on-site availability, stability, reproducibility, accuracy, and detection of multiple ions are all advantages of electrochemical detection of metal ions. CV is a technique for identifying and distinguishing redox behaviour, stability, and surface area of the working electrode used in electrochemical sensing. This method uses modified electrodes to generate selectivity for a small number of metal ions. The choice of working electrodes, on the other hand, is critical for successful CV analysis. There are numerous studies based on various metal oxide nanoparticles. Due to their catalytic nature, low cost, stability, nontoxic nature, huge surface area, low detection limit, natural abundance, and high energy density, manganese oxide nanoparticles are among the most viable contenders as electrode material. Only a few studies based on these materials have been published for metal ion detection. $Mn_3O_4$ is well-known for its high electrocatalytic activity, making it an ideal electrode for gas and biosensors. For trace metal ion detection, a mixture of Cn and $Mn_3O_4$ has yet to be explored. By altering a platinum (Pt) electrode with manganese oxide ($Mn_3O_4$) and chitosan, an electrochemical sensor for selenium and nickel detection in various water sources is produced in this study.As a result of industrialization, poisonous metal ions are being dumped into freshwaters, contaminating them. As a result, determining these metal ion traces in freshwaters before use is critical. This is the first report

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of an electrochemical selenium and nickel sensor based on $Mn_3O_4$-Cn nanocomposite for selenium and nickel level detection in lake water. FESEM is used to examine the morphology of $Mn_3O_4$ nanorods isolated from AAO. The surface morphology of $Mn_3O_4$-Cn was examined by FESEM, confirming nanocomposite production. Chitosan has a strong bond with $Mn_3O_4$ nanorods, generating a $Mn_3O_4$-Cn nanocomposite. The detection of Se (IV) and Ni (II) in the presence of other widely occurring ions in water is extremely important. As a result, the interference of various ions such as $Cd^{2+}$, $Mg^{2+}$, $Fe^{2+}$, $As^{2+}$, $PO_4$, I, $Cu^{2+}$, Br, $Pb^{2+}$, $Li^{2+}$, $Ba^{2+}$, and $SO_4$ at a 5-fold concentration compared to 50 g/L selenium and nickel is investigated.