Preparation of Ti₃C₂-PANI Composite as Sensor for Electrochemical Determination of Mercury Ions in Water

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Mercury ion (Hg²⁺) pollution is very harmful to the environment and human body. A PANI modification was applied to the surface of Ti₃C₂ slices by a simple and safe, low temperature stirring method. In this paper, a PANI-Ti₃C₂ composite with improved electrochemical performance was successfully prepared. Further study and analysis based on electrochemical tests concluded that the PANI-Ti₃C₂ composite significantly increased the electrochemical properties. The prepared composite was used as a surface modification for a glassy carbon electrode. Then, the modified electrode was used for the electrochemical determination of mercury ions. After optimization, the proposed electrochemical sensor showed a linear detection range between 0.1 and 20 µg/L with a low limit of detection of 0.017 µg/L. In addition, the proposed electrochemical sensor was successfully used for detecting mercury ions in tap water and water from Fuxian Lake.

Keywords: Electrochemical sensor; Mercury ions; Fuxian Lake; Mxene; PANI

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