An Electrochemical Sensor for Determination of Sulfite (SO_3^{2-}) in Water Based on Molybdenum Disulfide Flakes/Nafion Modified Electrode

Jie Yang^{1,*}, Xiangyu Xu¹, Xuyan Mao¹, Liang Jiang¹, Xueliang Wang^{2,*}

¹ Bio-nanotechnology & Medical Engineering Institute, Jining Medical University, 272067, P. R. China

² School of chemistry and Chemical Engineering, Heze University, 27500, P. R. China

*E-mail: yangjiequst@126.com; qust-1977wxi@163.com

doi: 10.20964/2020.10.48

Received: 19 June 2020 / Accepted: 6 August 2020 / Published: 31 August 2020

The assay for monitoring the content of sulfite ions (SO_3^{2-}) is essentially important because sulfite has some seriously toxic effects on both environment and human health. For this, a SO_3^{2-} electrochemical sensor was fabricated utilizing molybdenum disulfide (MoS_2) and Nafion. The cyclic voltammetry (CV) and differential pulse voltammetry (DPV) showed that MoS_2 had excellently catalytical activity for the redox of SO_3^{2-} . After the conditions, such as the acidity of supporting electrolyte, scan rates, and other factors, for the electrochemical response of SO_3^{2-} were optimized, the proposed sensor showed a wide dynamic linear range from 5.0×10^{-3} to 0.5 mM ($r = 0.997$, $n = 15$) for determination of SO_3^{2-} with the limit of detection (LOD) of 3.3×10^{-3} mM, which can be applied for detecting the content of SO_3^{2-} in water with the advantages of good reproducibility, anti-interference, long-term stability and satisfactory recovery.

Keywords: MoS_2 ; Nafion; Sulfite; Nafion; Electrochemistry; Sensor

[FULL TEXT](#)

© 2020 The Authors. Published by ESG (www.electrochemsci.org). This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution license (<http://creativecommons.org/licenses/by/4.0/>).