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TECHNICAL FACULTY IN BOR



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CAPTURING SULFUR DIOXIDE AT ITS SOURCE: SIMPLE AND EFFICIENT METHOD FOR SAMPLING AND QUANTIFICATION

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Abstract

• Introduction and scope

Sulfur dioxide (SO₂) is a widespread pollutant gas that releases during many industrial processes [1]. SO₂ has significant environmental and health implications [2], making its accurate quantification essential. The aim of this paper was to develop a simple and efficient laboratory-scale method for the sampling and quantification of SO₂ at its source.

• Methodology

SO₂, generated in the reaction between sodium metabisulfite and orthophosphoric acid, was routed through a condenser to a recipient vessel containing an absorptive solution of sodium hydroxide. The absorption of the SO₂ was performed with a consistent gas flow rate, facilitated by the use of a vacuum pump within the reaction system. Aqueous solution of potassium dichloroiodate(I) [3] was employed for volumetric determination of sulfite content in the final absorptive solution.

• Results

Based on the results of sulfite content determination in the final absorptive solution, which exhibited an analytical recovery of SO₂ ranging from 83% to 96%, the effectiveness of the proposed method is demonstrated.

• Conclusion

According to the obtained results and the multifaceted challenges associated with the sampling of gaseous fluids, this study can serve as a valuable guideline for the sampling of gaseous mixtures containing SO₂. Usage of a vacuum pump in the sampling system helps minimize the loss of gaseous components in the final absorptive solution, whereas the described titrimetric method enables a simple and efficient analytical procedure for determining SO₂ content. Further research and refinement of this method could lead to its practical application in environmental monitoring and industrial processes.

Keywords: Sulfur dioxide, Simple sampling, Quantification of sulfur dioxide, Potassium dichloroiodate(I)

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