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DETECTION USING METAL
NANOPARTICLES: A CASE OF SILVER
TRIANGULAR NANOPATES AND
CHLORINE

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ACCEPTED MANUSCRIPT

TOWARDS HIGHLY SELECTIVE DETECTION USING METAL NANOPARTICLES: A CASE OF SILVER TRIANGULAR NANOPATES AND CHLORINE

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Abstract

The article describes a novel approach towards improving selectivity of volatile compounds detection using metal nanoparticles. It is based on combination of sensitive optical detection using convenient nanoparticle-modified paper test strips and dynamic gas extraction improving selectivity to volatile compounds. A simple and inexpensive setup allowing for realization of this combination is described. Analytical prospects of the approach are shown by the example of chlorine determination in highly salted aqueous solutions using silver triangular nanoplates and digital colorimetry. The limit of detection is equal to 0.03 mg L⁻¹ and the determination range is 0.1–2 mg L⁻¹. This determination can be successfully carried out in solutions containing at least 2·10⁵ greater molar amounts of Na⁺, K⁺, Zn²⁺, Cl⁻, SO₄²⁻, and H₂PO₄⁻ with no sample pretreatment. The approach seems to be compatible with different types of nanoparticles with respect to detection of various analytes, thus having good opportunities for further development.

Keywords: selective detection, dynamic gas extraction, metal nanoparticles, silver triangular nanoplates, chlorine, digital colorimetry

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