

**INVESTIGATION TO INCREASE THE SENSITIVITY
OF VANADOMOLYBDOPHOSPHORIC ACID
METHOD USED FOR COLORIMETRIC
DETERMINATION OF
PHOSPHATE**

By

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**Dissertation submitted in partial fulfillment of the
requirements for the degree of**

Master of Science in Analytical Chemistry

of University of Colombo,

Sri Lanka.

December 2007

ABSTRACT

The determination of phosphate by the vanadomolybdophosphoric acid colorimetric method is very selective. However, the sensitivity of the method is very low, as such there is a need to increase sensitivity.

Since it is very selective, sensitivity of this method was found to be increased with use of N-benzoylphenylhydroxylamine. It has now been observed that the addition of NBPHA to vanadomolybdophosphoric acid forms an intensely colored complex possessing an absorption maxima at 444 nm.

This system obeys Beer's law at 444 nm up to the concentration of phosphorus 2.0 mg dm^{-3} . The molar absorptivity at 444 nm was $8.0 \times 10^3 \text{ cm}^{-1} \text{ mol}^{-1} \text{ dm}^3$. (The molar absorptivity of vanadomolybdophosphoric acid at 470 nm is $550 \text{ cm}^{-1} \text{ mol}^{-1} \text{ dm}^3$.) The minimum detection limit lies in the region to 0.015 mg dm^{-3} .

Considerable amounts of cations and anions including a 25 fold molar excess of nitrate, a 34 fold molar excess of nitrite, a 37 fold molar excess of fluoride, a 24 fold molar excess of sulphate, a 0.4 fold molar excess of iron(II), a 2.2 fold molar excess iron(III), a 103 fold molar excess of calcium and a 172 fold molar excess of magnesium could be tolerated. Interference from iron(II) could be overcome up to a 2.2 fold molar excess of iron(II) by converting iron(II) to iron(III) using hydrogen peroxide .

The proposed method was successfully applied to determine the phosphate content (less than 2.0 mg dm^{-3}) in a sample of potable water.