Analysis of PO_4^{3-} in Drainage Water with UH5300

INTRODUCTION

UH5300 spectrophotometer was developed pursuing a new operability which has never existed in the past and the instrument can be controlled by iPad or Windows PC. When analyzing many samples or a change over a long period of time, the real-time confirmation of the data from a remote area is possible. The next sample can be prepared based on the analysis result or the status of the analysis can be confirmed at any time and therefore, the increased work efficiency can be expected. This time, phosphate ion in drainage water, that is to be controlled through the analysis of many samples, was analyzed. When the calibration curve was prepared for a range of 0.01 – 2.0 mg/L, a good calibration relationship with the correlation coefficient (R^2): 0.9997 was obtained.

METHOD

Analyte	:	PO_4^{3-}
Analysis method	:	Molybdenum blue (ascorbic acid reduction) method JIS K0102 46.1.1
Range of quantitative analysis	:	0.01 - 2.0 mg/L

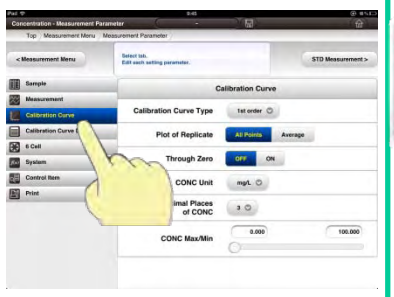
ANALYTICAL CONDITIONS

Instrument	: UH5300	Slit	: 1 nm
Scan speed	: 400 nm/min	Measurement wavelength	: 880 nm

Simple operation flow by a touch panel

Entering Analytical Conditions

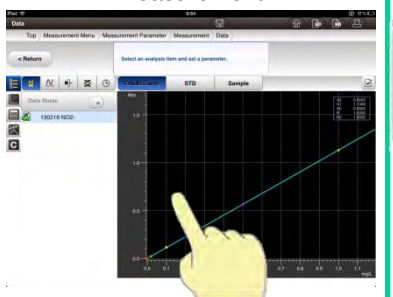
Select the measurement mode and set the analytical conditions



Screen to set analytical conditions

Starting the measurement for calibration curve

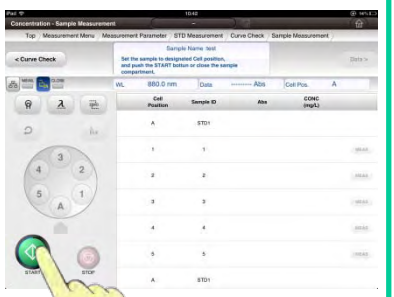
Perform auto-zero and start the measurement. The calibration curve will be displayed after the measurement.



Screen for calibration curve

Sample Analysis

Measure the sample. The data collection can also be repeated.



Screen for sample analysis

KEY WORDS

Environmental Analysis Related, Drainage Water, Environmental Chemistry, Environment, PO_4^{3-}, Phosphate Ion, Absorption Spectrum, Calibration Curve, Coloring Reagent, Phosphoric Acid, UV, UH5300, U-5100, U-2900

Spectrophotometer (UV)

Sheet No. UV120004-01

UH5300

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ANALYSIS METHOD

Sample 25 mL
↓ ← Reagent addition (*1) 2 mL
Stir
↓ ← Let stand for 25 min
Solution for measurement

Temperature: room temperature
*1 Ammonium molybdate-ascorbic acid mixed solution

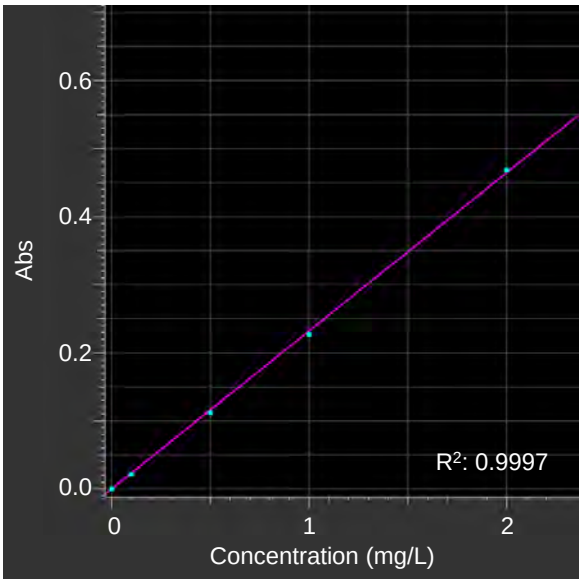
PREPARATION METHOD FOR AMMONIUM MOLYBDATE-ASCORBIC ACID MIXED SOLUTION

Solution 1: Ammonium molybdate solution
Weigh 6 g of Hexaammonium heptamolybdate tetrahydrate and 0.24 g of Bis[(+)-tartrato]diantimonate(III) dipotassium trihydrate, add water to dissolve, and make the volume to 300 mL.
↓ ← Sulfuric acid (2+1) 120 mL
Mix
↓ ← Ammonium amidosulfate 5 g
Mix and add water to make the volume to 500 mL

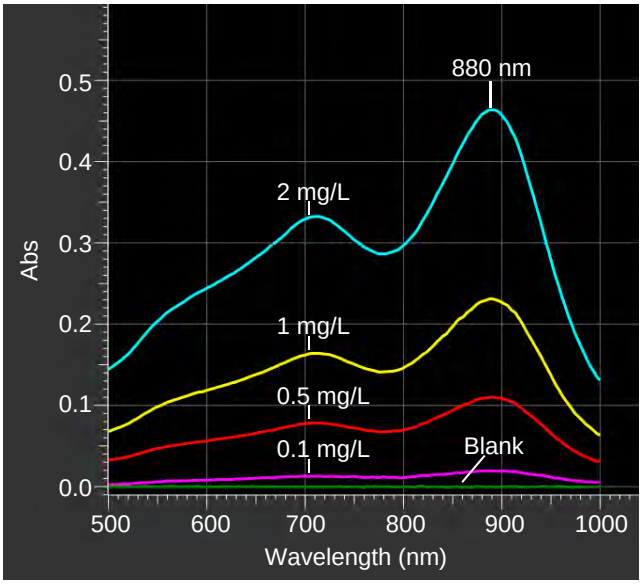
Solution 2: L(+)−Ascorbic acid solution
Weigh 7.2 g of L(+)−ascorbic acid and add water to make the volume to 100 mL

Mix the solution 1 and solution 2 at the ratio of 5:1 to prepare the ammonium molybdate-ascorbic acid mixed solution
(Prepare at the time of use)

ANALYSIS RESULT



Calibration Curve of Phosphoric Acid



Absorption Spectrum of Phosphoric Acid

Addition Recovery Test for Drainage Water

Drainage water	Drainage water + 0.5 mg/L	Recovery rate
ND	0.48 ± 0.003	95.2 ± 0.7 %

ND: Not detected, n = 3

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Spectrophotometer (UV)

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