

AQUACOUNTER Application Sheet	COM series	DATA No. G4	1st edition
<b>Metal</b>	<b>Quantification of Ni<sup>2+</sup> in mixed solution of Ni<sup>2+</sup> and Cu<sup>2+</sup></b>		

**1. Measurement outline**

Ni<sup>2+</sup> is quantified in sulfuric acid solution containing Ni<sup>2+</sup> and Cu<sup>2+</sup> in nearly equivalent concentrations by chelate titration. Since the EDTA chelate stability constants of Ni<sup>2+</sup> and Cu<sup>2+</sup> are nearly identical in the entire pH range, it is difficult to fractionate these components by pH adjustment. As a method for masking Cu<sup>2+</sup>, a method in which Cu<sup>2+</sup> is reduced to Cu<sup>+</sup> with sodium thiosulfate in acidic range is used.

This section introduces an example of photometric titration with EDTA titrant using PAN indicator (red purple → yellow) by adjusting the sample solution to approximately pH4 – 5 and adding excessive sodium thiosulfate against Cu<sup>2+</sup>.



**2. Reagents and Electrodes**

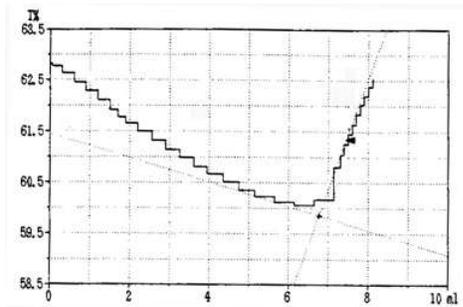
(1) Reagents	Titrant	0.01mol/L EDTA titrant
	Masking reagent	1g sodium thiosulfate
	Buffer	10mL acetic acid-sodium acetate buffer (pH4 – 5)
	Indicator	0.1mL PAN (1-pyridylazo-2-naphthol) indicator (2% ethanol solution)
(2) Electrodes	Photometric probe with 530 nm filter	

**3. Measurement conditions example (for COM-1600M w/ Photometric unit)**

<b>Master File No.1</b>	
<b>Condition file: 1</b>	
Method	F Cross
Amp No.	2
Buret No.	1
Meas Unit	T%
S-Timer	0 sec
CP	0 mL
DP	1 mL (for Ni <sup>2+</sup> ) / 0 mL (for Cu <sup>2+</sup> )
End Sens	30 (for Ni <sup>2+</sup> ) / 300(for Cu <sup>2+</sup> )
Over mL	0 mL
Max Vol	20 mL (for Ni <sup>2+</sup> ) / 50 mL (for Cu <sup>2+</sup> )
Mode No.	5
Unit	g/L
Blank	0
Factor	Titer of the titrant
Molarity	0.01
K	58.71 (as Ni <sup>2+</sup> ) / 63.546 (as Cu <sup>2+</sup> )
Formula	(D-B)×K×F×M/S

<b>Mode No.5</b>	
Pre Int	0 sec
Del K	5
Del Sens	0 mV
Int Time	3 sec
Int Sens	3 mV
Brst Speed	2
Pulse	40

#### 4. Measurement example



#### Measurement results on nickel ion

Sample No.	Sample volume (mL)	Titration value (mL)	Concentration (g/L)
1	10	6.759	19.96
2	10	6.842	20.20
<b>Avg.</b>			<b>20.08 g/L</b>

#### 5. Outline

##### (1) About end point detection

The titration curve in this section did not deliver a clear curve. It is assumed that the color change for the indicator (red purple → yellow) is inhibited by the effect of coexisting Cu<sup>+</sup>.

##### (2) About the indicator

It is possible to quantify easily by chelate titration with MX indicator (yellow → blue purple) under ammoniacal condition (pH10) when Ni<sup>2+</sup> is quantified singly.

#### Key words

Chelate titration, nickel, fractionation titration, masking of copper ion

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