

# Cu

## **DIGESTION OF COPPER ORES + COPPER CONCENTRATES USING COLDBLOCK™ DIGESTION CB12L TECHNOLOGY**

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### **Introduction**

This application note will focus on the digestion of Copper Ores and Copper Concentrates using ColdBlock™ Digestion CB12L Technology.

### **Method**

Four CRMs (Certified Reference Materials) from ORE Research & Exploration were used in this investigation

- Triplicate samples of OREAS 622, OREAS 624, OREAS 603 & OREAS 991 were weighed to 0.25g and placed in ColdBlock™ Digestion test tubes.
- OREAS 622, 624, & 603 were digested with 8 mL Sulfuric Acid + 5.5 mL Phosphoric Acid at 85% power for 20 minutes. Chiller temperature was set to -5° Celsius.
- After digestion and subsequent cooling, samples were normalized to 50mL with 1% HNO<sub>3</sub>, centrifuged and analyzed using an Agilent 5100 ICP-OES.
- OREAS 991 was digested with 12mL Reverse Aqua Regia at 65% power for 15 minutes and normalized to 50mL with 50% HCl. Chiller temperature was set to -5° Celsius.

## Method (cont'd)

**Table 1: OREAS-622 Certified Values of Major Elements (4-Acid Digestion Method)**

Na, Sodium (wt.%)	0.729
Mg, Magnesium (wt.%)	0.562
Al, Aluminium (wt.%)	5.77
Ca, Calcium (wt.%)	2.14
Ti, Titanium (wt.%)	0.147
Mn, Manganese (wt.%)	0.060
Fe, Iron (wt.%)	4.31
Cu, Copper (wt.%)	0.486
Zn, Zinc (wt.%)	10.24

**Table 2: OREAS-624 Certified Values of Major Elements (4-Acid Digestion Method)**

Na, Sodium (wt.%)	0.475
Mg, Magnesium (wt.%)	1.26
Al, Aluminium (wt.%)	4.20
Ca, Calcium (wt.%)	1.49
Ti, Titanium (wt.%)	0.118
Mn, Manganese (wt.%)	0.066
Fe, Iron (wt.%)	16.21
Cu, Copper (wt.%)	3.10
Zn, Zinc (wt.%)	2.40

**Table 3- OREAS-603 Certified Values of Major Elements (4-Acid Digestion Method)**

Na, Sodium (wt.%)	0.428
Mg, Magnesium (ppm)	828
Al, Aluminum (wt.%)	3.98
Ca, Calcium (wt.%)	0.318
Ti, Titanium (wt.%)	0.191
Mn, Manganese (ppm)	133
Fe, Iron (wt.%)	2.92
Cu, Copper (wt.%)	1.00
Zn, Zinc (wt.%)	0.920

**Table 4: OREAS-991 Certified Values of Major Elements (4-Acid Digestion Method)**

Cu, Copper (wt.%)	20.66
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## Results

**Table 5: ColdBlock™ Digestion CB12L Recoveries (%) OREAS-622**

Na, Sodium	99
Mg, Magnesium	102
Al, Aluminium	96
Ca, Calcium	99
Ti, Titanium	128**
Mn, Manganese	100
Fe, Iron	99
Cu, Copper	101
Zn, Zinc	100

\*\* Recovery is high when compared to 4-acid digestion, when compared to OREAS' peroxide fusion method Ti recovery is 100%.

**Table 6: ColdBlock™ Digestion CB12L Recoveries (%) OREAS-624**

Na, Sodium	102
Mg, Magnesium	102
Al, Aluminium	90
Ca, Calcium	96
Ti, Titanium	127**
Mn, Manganese	103
Fe, Iron	98
Cu, Copper	99
Zn, Zinc	97

\*\* Recovery is high when compared to 4-acid digestion, when compared to OREAS' peroxide fusion method Ti recovery is 103%.

## Results (cont'd)

**Table 7: ColdBlock™ Digestion CB12L Recoveries (%) OREAS-603**

Na, Sodium	99
Mg, Magnesium	103
Al, Aluminium	93
Ca, Calcium	97
Ti, Titanium	104
Fe, Iron	101
Cu, Copper	105
Zn, Zinc	101

**Table 8: ColdBlock™ Digestion CB12L Recoveries (%) OREAS-991**

Cu, Copper	100
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**\*Table 9: Recoveries (%) of 30g Digestions of OREAS-991 in 133mL Reverse Aqua Regia (3:1, HNO<sub>3</sub> : HCl) 80% Power 15 Minutes**

Cu, Copper	100
Au, Gold	100
Ag, Silver	100

\* Normalized in a volumetric flask to 250mL with 0.5% L-cysteine & 15% HCl.