Determination of Elements in Boron Industry Wastes by ICP-OES Spectrometer

Y. Erdoğan, C. Yenikaya, N. Büyükkıdan, N. Atar, F. Özmal
Dumlupinar University, Faculty of Arts and Sciences, Department of Chemistry, Kütahya

ABSTRACT: In this study, the possibility of finding some economically valuable elements in boron industry wastes is determined by ICP-OES method.

1. INTRODUCTION

Colemanite ore from Kütahya-Emet- Hisarcık and tincal ore from Eskişehir-Kırka are drawn by surface mining. These ores are enriched in concentrator with cracking, washing and elimination processes. Approximately, the raw ore enriched in concentrator contains waste material over 10%. Large amounts of waste materials are dumped in these plants (Savaş, M., 1994, Erdoğan et all., 1998).

ICP-OES Spectrometer itself is usually used to detect trace amounts of elements, which after being atomized and heated, show characteristic sharp emission lines.

2. MATERIALS AND METHOD

Tincal ore waste was supplied from Eskişehir-Kırka Boron Plant, and colemanite ore waste was supplied from Kütahya-Emet Boron Plant.

The samples were grinded and then solved properly. Afterwards analyzed with ICP-OES spectrometer.

3. RESULTS AND DISCUSSION

The results are shown in Table 1-2 above.

Table 1. Amounts of elements in tincal ore waste

Element	Concentration (ppm)	Element	Concentration (ppm)
Dy		Au	
B	71270	V	
Ti	638,4	Yb	
Bi		Er	2636
Cd		Zr	676,4
Ba		Tl	
Co		Pb	
Cs	19900	Li	172,9
U		K	
Nb		Ca	112200
Ru		Sr	
Th	600,8	Sc	
W		S	
Be		Ni	69,70
P		Cu	
Pt		Na	312500
Al	70190		

Table 2. Amounts of elements in colemanite ore waste

Element	Concentration (ppm)	Element	Concentration (ppm)
Dy		Au	
B	44930	V	
Ti	95,06	Yb	1,737
Bi		Er	
Cd		Zr	
Ba		Tl	
Co		Pb	
Cs	19810	U	76,49
U		K	
Nb		Ca	323500
Ru	51,67	Sr	
Th		Sc	
W		S	
Be		Ni	
P		Cu	
Pt			
Al	36470		

4. CONCLUSION

As seen from the results that, there are many rare and the other elements in tincal ore waste and colemanite ore waste. Some of these elements are valuable. If the analyses of other boron ore wastes are made, grade calculation can be done. If the elements have convenient concentration values, this is important for the development of Turkey. Because, there is no production of these elements in Turkey. In addition to this, we know from literature that, there is no enough research and knowledge about this strategic element.

One of the basic aims of this study is to carry out the valuable and strategic elements from tincal ore waste and colemanite ore waste. Rare earth element content possibilty of the samples increases the importance of the study. We got some results after the analysis of the samples. There is a necessity of quantative analysis by other techniques to make sure of the results of the research. In order to get correct results from ICP technique, enrichment of the analyzed elements must be done. For a more detailed result, the elements that can be analyzed by ICP-OES accept performed elements must be examined.

Turkey must make investment about these valuable elements and become a country which compete with other countries. For this purpose;

1. Searching of wastes that includes rare earth and valuable elements must be accelerated.

2. For the usage of established elements in advanced technology, researches must be supported. Research centers must be set.

3. The study that was applied must be adapted to other boron ore wastes.

4. At least one of this established elements in this study, whether its grade is convenient, is going to be a major subject for development of Turkey.

REFERENCES

Savaş, M., "Etibank Emet Kolemanit İşletmesi Gölet Atıklarının Zenginleştirme Olanaklarının Araştırılması", Osmangazi Üniversitesi, 1994

Y., Erdoğan, M., Aksu, A., Demirbaş, Y., Abalı, "Analyses of Boronic Ores and Sludges and Solubilities of Boron Minerals in C02-satureted Water", Resources, Conservation and Recycling 24,275- 283,1998