

# EXPERIMENTAL STUDY OF DIVISION PLATINUM GROUPS ELEMENTS (PGE), GOLD AND RARE EARTHS-ELEMENTS (REE), AT SIMLTANEOUS PRESENCE IN GEOLOGIC OBJECTS

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Estimation of allocation in magmatic rocks of consistent and inconsistent admixtures elements is one of actual problems of modern petrology. It is referred, in particular, to such contrast groups of elements by properties, as platinoids and lanthanoids. Special sample preparation with the subsequent concentrating and separation is for their detection required in view of the small contents of these elements.

The modern instrumental methods allow to determine both noble metals (NM), and rare earths-elements (REE) in geochemical objects with a low limit of detection. The determination of REE is handicapped due to spectral interference, connected with fluctuations of matrix background signal, conditioned by electron - ionic recombination.

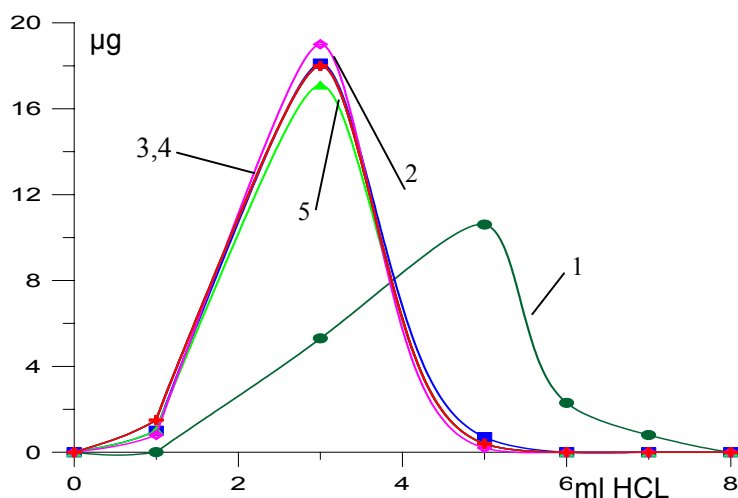
Method of cation-exchange column chromatography is widely used for REE division from matrix elements (Fe, Ca, Na, Mg, Ni etc.). Ion exchanger is the sulphonated copolymer of styrene and divinyl benzene [1].

Chemical properties of REE are very similar due to an identical configuration characteristic of exterior electronic levels ( $5d^1 6s^2$ ) and are characterized by oxidation level for lanthanoids +3. Platinum metals and gold are in the form of anionic chlorine-complexes, which composition can vary depending on composition of solution, in contrast to lanthanoids, existing in chloride solutions in the form of aquatic cations. Such distinctions in lanthanoids properties and noble metals allow to separate REE and NM from one sample with the subsequent concentrating and their determination.

T. Meisel and others [2] have used sulfonic cation (-exchange) resin for separation of platinum metals from matrix elements, the subsequent determination of platinum metals was carried out by mass spectrometry method with inductively - connected plasma (ICP-MS) in on-line mode.

Optimal conditions were selected by us for separation of NM, matrix elements (ME) and PGE in case of their simultaneous collateral presence on modeling systems by a method of column chromatography with use cation exchanger of the mark DOWEX-50W8 (with graining 200-400 and 100-200 mesh).

The determination of NM, EM and PGE was carried out by method of atomic emission spectroscopy with inductively - connected plasma (AES-ICP) with using the IRIS Interpid II Duo instrument of firm Thermo Electron Corporation end by atomic absorption method of spectrometry with electrothermal atomization (ETAAS), using the instrument Solaar MQZ of the same firm.



**Fig.1.** Eluating Curves: 1 gold;  
2 - rhodium; 3,4 - platinum, iridium;  
5 – palladium

Eluting curves of modeling solutions, containing by 20  $\mu\text{g}$  of gold, platinum, palladium, rhodium and iridium, received by usage of column with inside diameter 0.6 cm and sorbent layer height 4.5-5 cm are presented in fig.1. Eluating is performed with help of 0.5 M hydrochloric acid.

Eluating curves character of NM, matrix elements and REE received on various columns is presented in fig. 2. 0.1M HCl is used for eluating platinum metals and gold; 2M HCl - for matrix elements, and 6M HCl - for lanthanoids. The concentrations NM from 0.02 up to 10  $\mu\text{g}/\text{ml}$  are studied, and total concentration of matrix elements for rare earths elements from 0.2 up to 5  $\mu\text{g}/\text{ml}$  is up to 1 mg/ml.

Standard rock samples, containing rare-earth and platinum elements, are studied in order to study of real geologic objects.

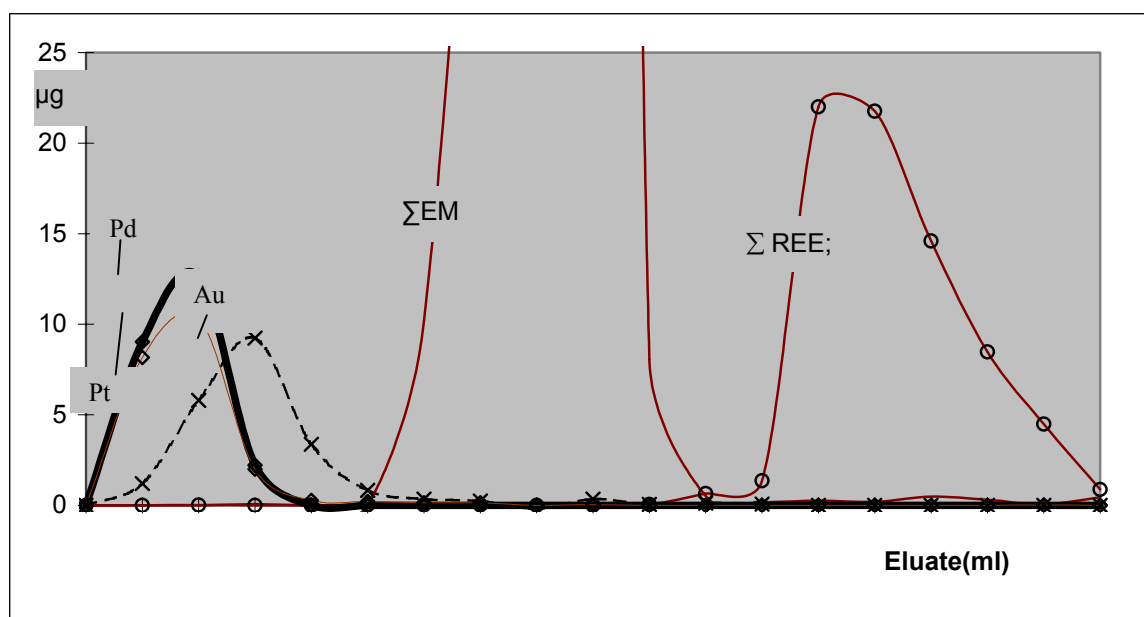


Fig.2. Eluating Curves Character from sorbent

## References

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Electronic Scientific Information Journal "Herald of the Department of Earth Sciences RAS" № 1(24) 2006  
ISSN 1819 – 6586

Informational Bulletin of the Annual Seminar of Experimental Mineralogy, Petrology and Geochemistry – 2006  
URL: [http://www.scgis.ru/russian/cp1251/h\\_dgggms/1-2006/informbul-1\\_2006/elaborat-8e.pdf](http://www.scgis.ru/russian/cp1251/h_dgggms/1-2006/informbul-1_2006/elaborat-8e.pdf)

Published on July, 1, 2006

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