

Geochemical behavior of Cu and other elements in polymetallic deposits in Qarah Gol area, Meshgin Shahr, Ardabil province

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Qarah Gol study area is located in Ardabil province, 50 km from Meshgin shahr city in Moradloo section. The study area is located in the geologic map of Ahar (1: 250,000 schale) and the geological sheet of Lahroud (1: 100000 schale) between longitude 47°39 ' to 47°49 ' east and latitudes 38°41 ' to 38°46 ' north. To investigate the geochemical distribution of trace elements and gold, 23 surface samples from suspected mineralization areas were analyzed by ICP-OES and Fire Assay methods, respectively, and 14 samples were drilled from 5 boreholes drilled in the area to measure the main oxides and Rare and rare earth elements were analyzed by XRF and ICP-MS methods, respectively. The correlation coefficients between Cu with Au and Mo are among the highest in the table, with Pearson coefficient values of 0.81 and 0.63, respectively. Zinc has the highest correlation coefficients with iron and manganese in Qarah gol area Also, arsenic and antimony elements with correlation coefficients of 0.51 and 0.56 are suitable tracers for lead. (Tab. 1). Spearman's correlation indicates that the closest tracer to the copper is molybdenum and gold, respectively, which have a correlation coefficient of 0.530 and 0.513(a moderate correlation) (Tab. 2). The best lead detector in the region is the antimony element with a coefficient of 0.5, the zinc element in the study area has the highest correlation coefficients with iron and manganese. The strong correlation between copper with gold and molybdenum as same as other porphyry copper deposits represent that this area is located in the center of mineralization system.

Table 1. Pearson correlation coefficient

Table 2. Spearman correlation coefficient

Keywords: geochemistry, correlation coefficient, Qarah Gol, Meshgin Shahr, Ardabil

Refrences:

Sanford J.C. Smith F.D. Russel J.A. 1993. Optimizing the biolistic process for different biological applications. *Methods in Enzymology* 217 :483-509.

	Au	As	Cu	Fe	Mn	Mo	Pb	S	Sb	Zn
Au	1	0.561**	0.818**	-0.076	-0.154	0.613**	0.010	0.379	0.144	0.015
As	0.561**	1	0.633**	0.393	0.226	0.440*	0.514*	0.548**	0.549**	0.360
Cu	0.818**	0.633**	1	0.139	0.017	0.563**	0.226	0.371	0.420*	0.345
Fe	-0.076	0.393	0.139	1	0.647**	0.228	0.133	-0.024	0.138	0.814**
Mn	-0.154	0.226	0.017	0.647**	1	-0.138	-0.046	-0.535**	0.053	0.756**
Mo	0.613**	0.440*	0.563**	0.228	-0.138	1	0.003	0.407	0.140	0.171
Pb	0.010	0.514*	0.226	0.133	-0.046	0.003	1	0.461*	0.563**	0.135
S	0.379	0.548**	0.371	-0.024	-0.535**	0.407	0.461*	1	0.435*	-0.206
Sb	0.144	0.549**	0.420*	0.138	0.053	0.140	0.563**	0.435*	1	0.183
Zn	0.015	0.360	0.345	0.814**	0.756**	0.171	0.135	-0.206	0.183	1

Correlation is significant at the 0.01 level (2-tailed) .**

Correlation is significant at the 0.05 level (2-tailed) .*

	Au	As	Cu	Fe	Mn	Mo	Pb	S	Sb	Zn
Au	1.000	0.257	0.513*	-0.309	-0.450*	0.524*	-0.141	0.421*	0.220	-0.228
As	0.257	1.000	0.280	0.388	0.318	0.353	0.327	0.400	0.512*	0.314
Cu	0.513*	0.280	1.000	0.164	0.051	0.530**	-0.042	0.123	0.363	0.453*
Fe	-0.320	0.388	0.164	1.000	0.764**	0.131	0.224	-0.079	0.081	0.748**
Mn	-0.450*	0.318	0.051	0.764**	1.000	-0.115	0.011	-0.520*	-0.050	0.759**
Mo	0.524*	0.353	0.530**	0.131	-0.115	1.000	-0.052	0.382	0.086	0.130
Pb	-0.141	0.327	-0.042	0.224	0.011	-0.052	1.000	0.390	0.500*	0.128
S	0.421*	0.400	0.123	-0.079	-0.520*	0.382	0.390	1.000	0.433*	-0.239
Sb	0.220	0.512*	0.363	0.081	-0.050	0.086	0.500*	0.433*	1.000	0.192
Zn	-0.228	0.314	0.453*	0.748**	0.759**	0.130	0.128	-0.239	0.192	1.000

Correlation is significant at the 0.01 level (2-tailed) .**

Correlation is significant at the 0.05 level (2-tailed) .*