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(Renison)

Ce

Eu

Oxygen and Carbon Isotopes and REE Study in the Emaft Fluorite Mine, Sawad Kouh Region(Mazandaran)

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Abstract

The Emaft Fluorite mine is located in 20km southeast of Pole – sefid area in Mazandaran Province . The host of the ore is Tizkouh Formation with lower Cretaceous age , which is fractured by the NE- SW trending fault. Its lithology includes biomicrite, micrite and mudstone altered to dolomite by hydrothermal fluids . The oxygen isotope values of the most altered carbonate (dolomites) surrounding the fluorite deposits show that these deposits subjected to low temperature hydrothermal fluids. There is a trend of decreasing lighter carbon and particularly oxygen isotope values towards the orebody. The lightest oxygen isotope values are close to the orebody. The oxygen and carbon isotope values in altered carbonate (dolomite) are significantly lighter than those least – altered dolomite away from mineralized area. The alteration percentage in oxygen and carbon isotopes are maximum close to the orebody. Thus , the alteration percentage of oxygen is %88 close to orebody but its minimum identified some about %19 far from orebody. These characteristics can be used as a key to explore the unknown orebody. The results of this study is similar to the tin ore deposits of Renison mine , Tasmania in Australia and Pb – Zn ore deposit of kouh - e -Sorme of Iran.

Due to the similarity in pattern of fluorite and host rock, it can be concluded that remobilization of REE and F occurred. The dissimilarity in normalized patterns of igneous rock, shale, sandstone and fluorite suggest that these rocks can not considered as the source rocks for F. The negative Eu anomaly and positive Ce anomaly, indicate a reduction environment for ore formation.

Keywords: Oxygen & Carbon isotopes, Dolomite, Alteration, REE, Mazandaran, Sawad kouh, Tizkouh Formation, Normalized Pattern, Emaft Fluorite Mine.

O O C C

(Open and close system)

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	$\delta^{13}\text{C}$ (PDB)	$\delta^{18}\text{O}$ (PDB)		
105 1	-1.5	-1.3	-2.7	19
90 2	0.4	-2	-4	23
75 3	-1.4	-1.7	-3	21
60 4	-0.	-8	-9.4	65
45 5	0.3	-6.7	-8	56
30 6	-0.8	-9.3	-10.7	70
15 7	-0.4	-11	-12.3	86
1 8	-2	-11.2	-12.6	88

[[]]

REE

(Dental drill)

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CO₂ ()

602D

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) ±0/1/00

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(mudstone)

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-1.3 -11.2PDB

-11.2

-1.3

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-2 0.4PDB

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$$= -11.2 + (-1.3) = -12.6$$

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$$- 12.6 + (- 1.6) = - 14.2$$

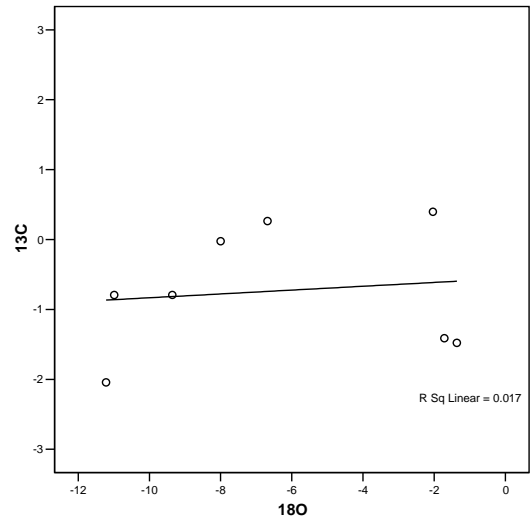
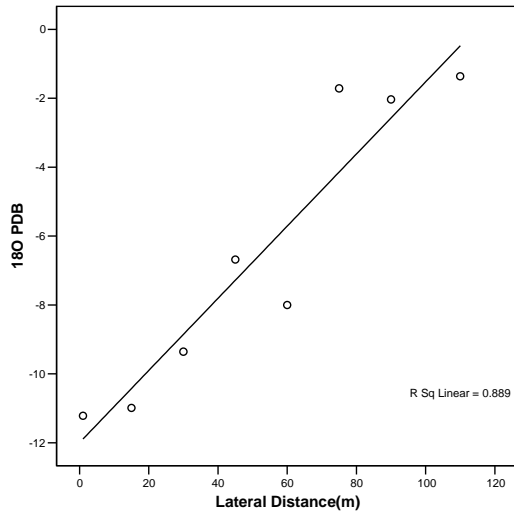
-14.2

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(y)

(x)

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Archive of SID

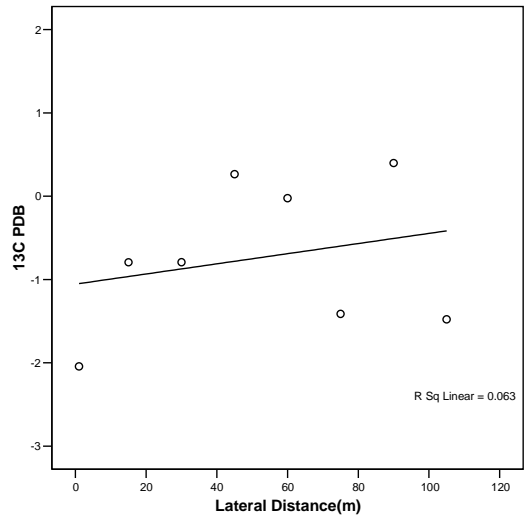
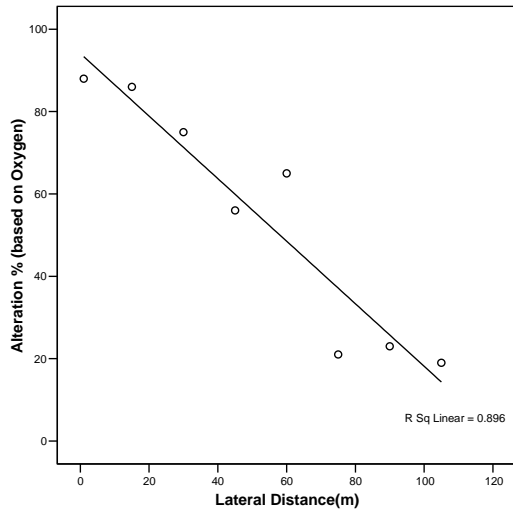
[] (Land)

$$T^0(C) = 16.4 - 4.3 \left([\delta^{18}O_{dol} - 3.8] - \delta^{18}O_{Water} \right) + 0.14 \left([\delta^{18}O - 3.8] - \delta^{18}O_{Water} \right)^2$$

$$\delta^{18}O_{dol} =$$

$$\delta^{18}O_{Water} =$$

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$$\frac{\delta^{18}\text{O}_{\text{Water}}}{\delta^{18}\text{O}_{\text{dol}}}$$

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PDB

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	Sample	La	Ce	Pr	Nd	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu	L REE	H REE	REE
	6242	0.05	0.42	0.05	0.25	0.07	0.04	0.05	0.02	0.05	0.02	0.05	0.05	0.05	0.02	0.88	0.31	1.19
	6218	0.05	3.65	0.35	1.49	0.26	0.07	0.2	0.04	0.23	0.04	0.13	0.05	0.11	0.02	5.87	0.82	6.69
	EM-1	0.05	0.94	0.09	0.43	0.09	0.03	0.07	0.02	0.06	0.02	0.05	0.05	0.05	0.02	1.63	0.34	1.97
	6223	32	72.6	8.02	36.3	5.98	1.8	3.97	0.6	3.51	0.58	1.61	0.21	1.31	0.18	156.7	11.97	168.67
	EM-3	70	138	11.8	50.2	7.59	2.53	5.48	0.87	5.18	0.9	2.54	0.37	2.39	0.34	280.12	18.07	298.19
	NO.3	0.59	0.78	0.09	0.31	0.04	0.02	0.05	0.02	0.03	0.02	0.05	0.05	0.05	0.02	1.83	0.29	2.12
	SH-S	46	108	11.5	49.7	8.83	2.38	6.41	1	6.17	1	2.66	0.33	1.96	0.24	226.41	19.77	246.18
	SH-SH	44	96.6	11.1	50.7	9.36	2.95	6.51	1.06	6.23	1.01	2.62	0.34	2.36	0.33	214.71	20.46	235.17

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Excel

HCL %

Amdel REE

IC3E/M

IC3E/M []

(digest)

[perchlorate& chlorides]

ICP-MS

REE

LREE []

...

HREE

[]

Eu+2

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Eu

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REE

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.REE

Eu

Eu

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Lu Tb Dy Tm Ce

REE

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Archive of SID

REE ()

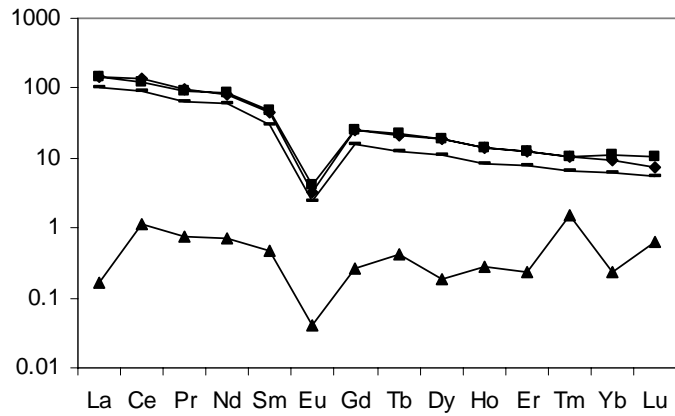
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REE

Eu

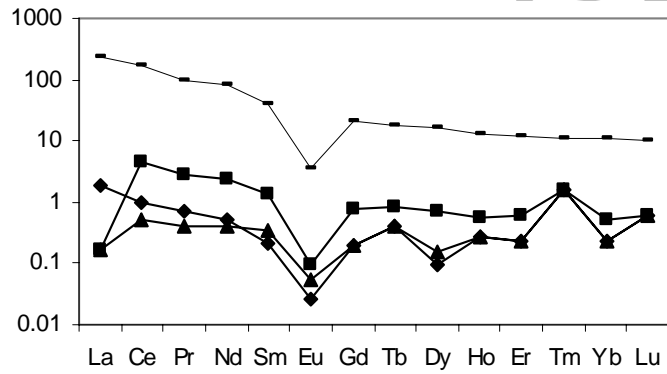
Ce

Tm



■ ماسه سنگ ◆ شیل — سنگ میزبان ▲ دیاباز خارج روستا

A



— فلوریت ترانشه کردها ■ فلوریت ترانشه ۱ ◆ فلوریت ۳ No ▲ دیاباز داخل روستا
- (B) (A)

B

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HREE

LREE

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Mato preto)

(Mato Dentro, Volta Grande

Eu

[] Ce

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