PETROLOGICAL AND GEOCHIMICAL CONSIDERATION ON THE TUYSERKANITE METEORITE

M.H. EMAMI [1], R. MONSEF [2]

1- Research Institute of Geosciences – Geological Survey of Iran
2- Department of Geology – Estahban Azad University – Fars, Iran

On June 27th,1985, near midnight, according to the visual observation of people in Tuyserkan ,a light gray meteorite with dark vein system in 5.7 kg weight fell from the sky that its landing in Esmaeel Abad (Hamedan province ,Iran).The meteorite was radiating a yellow to red light at the time of falling and it was hot till tomorrow morning .Thermal temperature of the meteorite is estimated between 700 to 1000 C and in external surface it has a thin glassy layer which its' thickness not exceed than 1 mm. The mentioned layer is the result of external melting and fast getting cold of meteorite in moving to atmosphere. Its dimension is 21 cm length, 19 cm width and diameter of it is 14.5 cm .Density of the whole meteorite is 2.30 kg/m^3 ,which in parts with less vesicular and more concentrated dark minerals and basic materials , it reaches to 2.40 kg/m^3.Because of its' falling place in Toyserkan city ,we called it Tuyserkanite (fig1). Regarding to the size and weight of the meteorite, meteorite crater in ground wasn't considerable .Tuyserkanite, in respect of chemical compounds and higher amount of silica (SiO2=93%), is only comparable with some Tektites. It consists of two dark and light ones .The light part is contain of cristobalite , quartz and a little amount of alkali feldspar ,accompanying with some minerals such as magnetite ,hematite , ilmenite and rutile ,and it is enriching of mafic minerals such as olivine ,in form of skeletal crystal and pyroxene with radiating spinifex texture. Chemical compounds of dark parts are equal to phenotephrite alkali basic rocks. The existence of vesicular texture and more vesicular vitric veins and veinlets in mafic and dark part are some pronounced features of Tuyserkanite. Both dark and light parts of Tuyserkanite with distinct and contrast composition is somewhat similar to immicible liquids. This phenomenon is resembled of magma crystallization in residual fluid of lunar rocks (low temperature), that it has seen in form of inclusion in many samples which were collected by Apollo 11&12. In main texture of the meteorite, we could see lunar regolith, along with Breccia which is resulted by shock effect. The mineralogy compound of this meteorite is similar to residual rhyolite observed in lunar basic rocks. But in compare to lunar rhyolite residual, Tuyserkanite is rich-silica rocks relatively poor in alkali feldspar (perhaps due to partial melting of k-feldespar during the shock effects). Isotope activity of ^{26}Al in the meteorite is equal to { 1.8± 2.5 dpm/kg }and activities of Isotope ^{208}Th, ^{214}Bi and ^{40}K are high in it and are similar to the more terrestrial differentiation rocks .The ratios of Isotope $^{87}Sr/^{86}Sr$ & $^{87}Rb/^{86}Sr$ in the whole of the Tuysekanite are {0.711625} and {1.257± 1}, But the problem is that tuyserkanite is fall sample and consist of high temperature minerals. In contrast with the comparative distribution of existing elements in crust, in the main compound of Tuyserkanit, we see high comparative amounts of Zn, Cr & Se, while Sr & Ba are lower and Zr is comparable with the mean compound of crust. Also in compound of basic vein part of Tuyserkanit in compare with the mean compound of crustal abundance of Basic rocks (diabase), we see high enriching of both Zn & Pb. The pattern of REE distribution in Tuyserkanit is similar to the relative pattern of Tektites of South Eastern Asia (fig2).Primary shock effects in Tuyserkanite indicate the impact between cosmolite that cause, partial melting of primary rocks and melt injection into the fractures and tracks in different direction, vein system in Tuysekanite convert to vesicular vitric texture due to high cooling of melting material. According to our study studies, this sample could be derived from high fractionate rhyolite composition which is similar to lunar residual rhyolitic rocks.

Fig 1: Tuyserkanite Meteorite

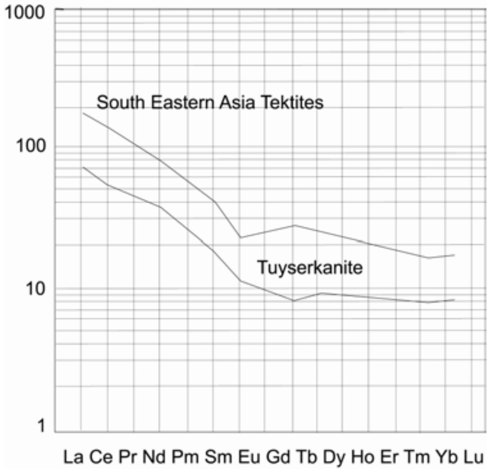

Fig 2 : Comparable REE pattern distribution diagram

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