Mineralogy and determination of tectonomagmatic setting of subplutonic rocks in North of Shahrekord by using Clinopyroxene mineral chemistry

Z. Eliasi¹, N. Emami², A. Nasre esfahani¹, B. Vahabi moghaddam¹

¹. Khorasgan Islamic Azad University
². Agriculture and natural resources research center of chahar mahal and bakhtiari province

(Received: 3/4/2010, in revised form: 7/8/2010)

Abstract: Subplutonic rocks of North Shahrekord at south-west of Iran as a part of Sanandaj - Sirjan tectonical zone have exposed as basic dykes. These rocks are dolerites with specific textures such as intergranular, intersertal, ophitic and poikilitic. The main constituteud minerals of the dolerites are plagioclase and clinopyroxene. The secondary minerals include sericite, calcite, chlorite, epidote, clinozoisite, sphenone and incidental minerals are apatite, magnetite, titanomagnetite and ilmenite. Clinopyroxenes are frequently augite and diopside as individual phases or as compositional zoning in one mineral. Geochemical and mineralogical evidence implicated toleitic and alkaline nature. Based on geotectonic discrimination diagrams founded clinopyroxenes mineral chemistry, studied subplutonic rocks probably have been formed in a tensional post subduction tectonical environment. Neverthless, these magmatism contributed to middle- upper kimmerian orogenic phase in late Jurassic to early cretaceous.

Keywords: Tectonomagmatic; Sanandaj-Sirjan zone; Shahrekord; Subplutonic; Clinopyroxene.
The synthesis of YBa$_2$Cu$_3$O$_{7-\delta}$ nanocrystalites via mechanochemical alloying & study transition temperature of xMnO$_2$ + (1-x) YBa$_2$Cu$_3$O$_{7-\delta}$ compounds

S. Yazdanian*, N. Tajabor, M. Behdani

Department of Physics, Faculty of sciences, Ferdowsi University of Mashhad, Mashhad, Iran

(Received: 12/5/2010, in revised form: 13/8/2010)

Abstract: In this research, YBa$_2$Cu$_3$O$_{7-\delta}$ ($0 < \delta < 1$) nanocrystalite superconductor was prepared by mechanochemical alloying method. We synthesized YBa$_2$Cu$_3$O$_{7-\delta}$ via mixing the BaCO$_3$, Y$_2$O$_3$, CuO powders and milling in SPEX 8000 for 5h with weight ratio of ball to powder 10:1 and steel balls of 11mm diameter, followed by heating for 4h at 850 °C. The superconductor phase formation process was completed with sintering treatment under oxygen partial pressures. The superconducting transition temperature of the samples was investigated using the four-probe method. Then transition temperature of xMnO$_2$ + (1-x) YBa$_2$Cu$_3$O$_{7-\delta}$ compounds was studied. The superconducting transition temperature of the final samples with x = 0, 0.005, 0.01 is found to be 83 K, and for the samples with x > 0.015, the superconductivity was vanished.

Keywords: Superconductivity; YBa$_2$Cu$_3$O$_{7-\delta}$; Mechanochemical; MnO$_2$; Transition Temperature.

*Corresponding author, Tel: 09155510082, Fax: (0511) 8763647, Email: YASAMAN_6060@yahoo.com
Mineralogy, thermobarometry and tectonic setting interpretation of gneisses from western Soltan Abad (NE Sabzevar)

S.M.H. Razavi¹, M. Nasrabady²

¹-Department of Geology, Tarbiat Moallem University, Tehran, Iran
²-Department of Geology, Imam Khomaini International University, Qazvin

(Received: 1/3/2010, in revised form: 16/8/2010)

Abstract: The study area is situated in the west of Soltan Abad prom NE Sabzevar (Razavi Khorasan province). There is an exposure of metamorphic complex that contains greenschist, blueschist, amphibolite and eclogite (?) facieses rocks. Gneissic body is located in the middle part of this complex (Koh-e-Chili). Protolith and foliation intensity are variable in this body. Field evidences, whole rock geochemistry, geochronological data and nearly the same metamorphic pressure conditions of gneisses and blue schists (Gneiss: P = 10.9 Kb and Blueschist: P = 11-14 Kb) indicate that protolith of the gneisses have been differentiated series of oceanic crust and have experienced subduction zone metamorphism along with mafic series of Sabzevar oceanic basin (blueschists) as a consequence of north-ward movement of central Iranian microcontinent in the Upper Eocene.

Keywords: thermobarometry; gneiss; blueschist; Soltan Abad; Sabzevar.
Field relations, geochemistry and geodynamic setting of the Bandan chromite mine, eastern Iran.

M. Delavari¹, S. Amini¹, E. Saccani²

¹- Department of Geology, Faculty of Science, Tarbiat Moallem University, Tehran.
²- Department of Geology, Faculty of Science, University of Ferrara, Ferrara, Italy.

(Received: 16/2/2010, in revised form: 20/8/2010)

Abstract: The Bandan chromite mine is the main chromite deposit in Sistan suture zone, eastern Iran. The chromite deposits are structurally tabular to lens-shaped bodies hosted by dunitic to harzburgitic mantle peridotites. Similar to Alpine type podiform chromites, chromitite pods are enclosed within dunitic envelopes. The chromites show mainly massive to disseminated and also brecciated textures. Chemically, the Cr/Fe ratio is higher than 2 and TiO₂ content in accordance with ophiolitic chromites is low (< 0.2 wt. %). As a result of low Cr# (Cr# = Cr×100/(Cr+Al)) ranging from 50 to 52 the Bandan chromite deposit is high-Al type. Calculated parental melt chemistry shows MORB (Mid-ocean ridge basalt)-type signature with Al₂O₃ and FeO/MgO ratio contents of 15-16 and 1.1-1.2, respectively. Although the geodynamic setting of high-Al podiform chromites have been debated but petrographical-geochemical characteristics of ophiolitic mantle-crust sequences may relate chromite genesis to supra subduction zone setting.

Keywords: podiform chromite; high-Al type; Bandan mine; eastern Iran.
Geochemistry and petrology of NE Naragh volcanic rocks: island arc or active continental margin magmatism?

Sh. Shahriari, M.R. Ghorbani*, R. Nasiri Bezenjani

Department of Geology, Faculty of Basic Sciences, Tarbiat Modares University, Tehran, Iran.

(Received: 14/5/2010, in revised form: 29/8/2010)

Abstract: The tectonic settings for the Urumieh-Dokhtar volcanic-plutonic belt provided by different researchers including active continental margin rift and post collisional settings. Geochemical and tectonic studies indicate that this belt belongs to the active continental margin. Basaltic andesite, andesite, trachy andesite, trachy dacite and dacitic rocks in NE Naragh, of the Urumieh-Dokhtar magmatic arc, Eocene in age, show some affinities to the volcanic island arc, in terms of geochemistry of major and trace elements. In comparison with the island arcs (e.g. Marianna) and active continental margin (e.g. the Andes), these rocks demonstrate intermediate characteristics. Specific tectonic setting and low thickness of the lithosphere of Central Iran during subduction of the Neo-Tethyan oceanic crust, is the main reason that resulted in the NE Naragh volcanic rocks with geochemical similarities to the island arcs.

Keywords: Geochemistry; Petrology; Volcanic rocks; Island arc; Active continental margin; Naragh.

*Corresponding author, Tel: (021) 82884405, Fax: (021) 82884435, Email: ghorbani@modares.ac.ir
First Report on Pb Isotope Composition of Dust Storms Particles in Khuzestan Province: Concerning on Source and Geo-Environmental Characteristics

A. Zarasvandi¹, F. Moore², A. Nazarpour³

¹-Department of Geology, Shahid Chamran University (SCU), Ahvaz, Iran
²-Department of Geology, Shiraz University, Shiraz, Iran
³-Department of Geology, Sistan and Baluchestan University, Zahedan, Iran

(Received: 2/4/2010, in revised form: 18/9/2010)

Abstract: Recently Khuzestan province in southwest of Iran is affected by dust storm phenomena. This feature makes some problem in agriculture, transportation, communication and human health side effect in this province. In the lack of enough researches on physical and chemical characteristics of this dust storm in Iran, a systematic investigation on these matters is necessary. In addition of Geochemistry of particles, isotope studies are very useful for determination of particle source. In this way, 26 samples from dust storms in Khuzestan province were collected for ICP-MS analysis in order to determination of Pb isotopes. These study show that average content of Pb in samples (10.95ppm) is higher than the standard and these isotopes show close relationship with PM2.5 particles. The comparison of Pb isotope ratios ($^{206}\text{Pb}/^{204}\text{Pb},^{207}\text{Pb}/^{204}\text{Pb},^{208}\text{Pb}/^{204}\text{Pb},^{207}\text{Pb}/^{206}\text{Pb}$) in the samples with upper crust show different source for particles. In general this study indicates that there is a different between the Pb isotopes ratios of the samples and natural sources. It can be result of anthropogenic activity such as oil industrial activities.

Keywords: Dust storm; Environmental Geology; Pb Isotope; Khuzestan Province.
Influence of Cation Valence and Concentration on the Results of X-Ray Analysis for Smectite Clay Mineral

V. R. Ouhadi*, S. I. Choobchian

Faculty of Engineering, Bu-Ali Sina University

(Received: 27/2/2010, in revised form: 7/7/2010)

Abstract: XRD analysis is used to distinguish the type of clay minerals in soils. This is also a helpful method to investigate the microstructure of soils. Generally, the intensity and position of XRD peaks are a function of fabric of clay particles and the thickness of double layer. Therefore, this method can be used to evaluate the behaviour variations of clayey soils under different environmental conditions. This paper is aimed to focus on the influence of cation valence and concentration on the results of X-ray analysis for smectite clay mineral from micro-structural (by the use of x-ray analysis) and macro-structural (by the use of sedimentation and permeability tests) points of view. NaCl and Na₂CO₃ were used as a source of mono-valence cations and CaCl₂ and Pb(NO₃)₂ were used as the source of di-valence cations. Furthermore, the behaviour is investigated after addition of lead nitrate to the calcite treated smectite. The results indicate that after addition of salt and heavy metal to smectite samples, the position and intensity of XRD peaks will change. In addition, the fabric variations of samples are function of valence and concentration of salts. The micro-structural and macro-structural changes are distinguishable for samples through experimental investigation. The results of this paper show that the presence of carbonate for increasing the buffering capacity of soil has more impact on the interaction process of soil-contaminant than the influence of PDI ions in increasing the surface potential of clay minerals.

Keywords: Smectite; X-Ray; Permeability; Cation Valence; Cation Concentration.

*Corresponding author, Tel-fax: (0811) 8221316, Email: vahidouhadi@yahoo.ca
Electrode fabrication for Lithium – Ion batteries by intercalation of CNTs inside nano metric pores of silver foam

B. Khoshnevisan*

Islamic Azad University – Qom branch

(Received: 18/7/2010, in revised form: 18/9/2010)

Abstract: Here ther is an on effort to improve working electrode (Ag + CNTs) preparation for Li-Ion batteries applications. Nano scaled silver foam with high specific area has been employed as a frame for loading CNTs by EPD method. In this ground, the prepared electrodes show a very good stability and also charge-discharge cycles reversibility.

Keywords: Carbon nanotubes; Li-Ion battery-Silver foam.

*Corresponding author, Tel: (0361) 5912585, Fax: (0361) 5552930, Email: b.khosh@kashanu.ac.ir
Petrology and geochemistry of andesitic dykes in the north of Rabor, Kerman province

M. A. Salari1, H. Biabangard1, M. Boomeri1, S. Dargahi2

1-Department of geology, Faculty of Sciences, Sistan and Balouchestan University
2-Department of geology, Faculty of Sciences, Shahid Bahonr University of Kerman

(Received: 8/5/2010, in revised form: 28/9/2010)

Abstract: The study area is located in the Kerman province, 10 Km north of Rabor. Geologically, the area is situated in the eastern section of Dehaj-Sarduiyeh belt which is a part of Urumieh-Dokhtar magmatic assemblage. The dykes were intruded in the Eocene pyroclastic rocks and Pliocene sedimentary units. Petrographic studies show that these rocks are andesitic in composition. Mineralogically they are composed of plagioclase, hornblende, biotite and clinopyroxene. Phenocrysts of plagioclase show disequilibrium textures such as oscillatory zoning and sieve texture. Hornblendes and biotites are affected by opacitization process. The dykes have mainly hyalloporphyritic, microlitic porphyric and flow textures. Based on geochemical studies, the rocks show enrichment in LREE rather than HREE. The lack of significant Eu anomalies in REE patterns indicates oxidation state of magma during crystallization. These properties are signatures of calc-alkaline series formed in a volcanic arc setting.

Keywords: Kerman province; Rabor; Petrology; Geochemistry; Andesitic dykes; volcanic arc setting.

*Corresponding author, Tel: 09137054421, Email: ma_salari63@yahoo.com
Genesis of Adakitic Magmatism in Masjed Daghi Region in Julfa, Eastern Azarbaijan

R. Yadollahi¹, A. Kananin*¹, M. Maanijou², F. Sarjoughian¹, Sh. Hassanpour³

¹- Faculty of Geology, College of science, University of Tehran, Iran
²- Geology Department, BuAli Sina University
³- National Iranian Copper Industries Company

(Received: 16/7/2010, in revised form: 12/10/2010)

Abstract: Eocene-Oligocene volcanic and subvolcanic bodies of Masjed-Daghi Located in 35 km East of Jolfa close of Aras River. On the base of structural geology the study area is a part of the West Alborz-Azarbayjan zone. Volcanic rocks are rhyolite, dacite to trachyandesite and subvolcanic rocks are porphyritic monzonite to diorite. The Formation of these rocks related to subduction zone in an active margin continent that are described by enriched LREE and LILE elements rather than HREE and HFSE, negative anomaly Ti, Ta and Nb elements and high ratio Ba/Nb and Ba/Ta in diverting tectonic setting diagrams. In this area, chemical characteristics such as SiO2>57%, MgO<3%, low ratio Y and Yb (Y<13 and YB<1.4), Sr/Y>40 and La/Yb>20 are representing formation from full of SiO2 adakitic magma. These evidences with geochemical diagrams probably indicate that studied rocks product from melting ocean crust along component eclogite and garnet amphibolite.

Keywords: Adakitic Magmatism; Subduction; Subducting oceanic crust; Masjed Daghi; Azarbaijan.

*Corresponding author, Tel: (021) 61112493, Fax: (021) 66491623, Email: Kananian@khayam.ut.ac.ir
Geochemistry and petrology of analcime-bearing trachy-andesite, Ardeha area, north of Bozghush, NW Iran

A.A. Kamali, A. Ameri, H. Pirooj*, A. Jahangiri, B. Mahmoud Salehi

Department of geology, faculty of natural sciences, Tabriz University, Tabriz-Iran.

(Received: 27/7/2010, in revised form: 19/10/2010)

Abstract: The studied volcanic rocks are located in south of Sarab at the northern part of the Bozghoush mountaion. The rocks are megaporphyry andesite flows and trachy andesite basalt lavas associated with tuff. In the northern part of the study area these rocks are covered with younger sediments of Quaternary age. These rocks are containing phenocrysts of analcime, olivine, pyroxene and plagioclase. The major textures of these rocks are porphyry with intersertal matrix. According to whole rock analysis of the study area, rocks they are trachy andesite and tephro-phenolite. Also these rocks are high potassic to shoshonitic nature with peralluminous character. Based on textural evidence analcime seems to be primary and formed directly from magma. The rocks of north Bozghoush shows a pronounced enrichment in LILE (Rb, Ba, Tb, U, k). Enrichment of incompatible elements of k and Rb and negative anomaly of Ti and Nb in these rocks are comparable with melts of lower crust. The spider diagrams and REE patterns show that the rocks of the study area are formed from the same source. Enrichment of incompatible elements can be related to mantle metasomatism or contamination of continental crust. In this regards negative anomaly of Ta, Nb and Tb (T N T) and also with respect of eventual Neo-Thetys subduction in this area and most probably enrichment of incompatible elements indicates effects of subduction on mantle sources. According to REE investigation most probably the main source of these rocks were phlogopite-bearing garnet lherzolite, with partial melting rate of 4-6 percent, at a pressure of 30-35 Kb and the depth of 90-100 Km.

Keywords: Bozghush; trachy-andesite; analcime; shoshonitic; garnet lherzolite.

*Corresponding author, Tel: 09163418804, Fax: (0641) 5262596, Email: Hadipirooj87@ms.tabrizu.ac.ir
The effects of acid drainage in formation of environmental minerals (secondary minerals) in Galand-rud coal mines and waste materials of Vatani coal washing, Mazandaran province

M. Aghaei-Kerigh*, M. Raghimi¹, G. Shamanian¹, M. Gholipour²

1- Department of Geology, Faculty of Science, Golestan University of Gorgan
2- Islamic Azad University of Gorgan, Young Research Club

(Received: 27/6/2010, in revised form: 19/10/2010)

Abstract: The oxidation of sulfide minerals in coal and mine's waste materials produce acid mine drainage. The evaporation, oxidation, dilution and neutralization of this acid drainage lead to formation of secondary minerals. Due to having broad surface spreading these minerals have the potential of maintaining sulfates and many of the metallic elements. In order to carry out mineralogical and geochemical studies on environmental minerals formed, the sampling has been done in the dumping site of the Vatani coal washing factory and coal mine of Galand-rud on 2008. On the basis of X-ray diffraction results the minerals identified are epsomite, hexahydrate, gypsum, halite, goethite, hematite, dolomite, siderite, kaolinite, montmorillonite, illite and quartz as major minerals and jarosite as a minor mineral. The geochemical analyses indicate the enrichment of MgO, SO₃ and trace elements of Cr, Pb, Co, Rb in secondary minerals relative to the mine's coal and dumped materials. On the other hand, the environmental minerals are enriched in Ni, Zn, pb, Cu, Cr, Co up to levels more than the Clarke abundance and average of China, America & world coal mines. On the basis of Gibb's diagrams the cations and anions present in mine’s drainages are originate from parent materials. According to hydrogeochemistry saturation index model in acid drainage of dumping area of Vatani coal washing factory, goethite, Iron, hydroxides, calcite, dolomite are in saturated, while iron sulfates melanterite and jarosite are under saturated.

Keywords: Acid mine drainage; environmental minerals; Mazandaran province; Galand-rud coal.
Petrography, geochemistry and tectonic setting of Roodare granitoid (South of Birjand)

S.S. Mohammadi*

Department of geology, faculty of sciences, University of Birjand

(Received: 6/3/2010, in revised form: 19/10/2010)

Abstract: Roodare granitoid outcropped at contact of upper cretaceous diabas in south of Birjand. It is compositionally ranging from tonalite to granodiorite and granite. The main minerals are plagioclase, quartz, alkali feldspar, hornblende and biotite. Disequilibrium evidences such as oscillatory zoning, embayment of hornblende and inclusion of plagioclase in alkali feldspar are present. Roodare granitoid is calc-alkaline, low to medium-K, metaluminous-slightly peraluminous and I-type. Based on HFSEs depletion (e.g. Nb, Ti, P, Y, Yb and Ta), these rocks belong to subduction-related tectonic setting. These depletions can be resulted from contamination and mixing of magma with crustal constituents during ascent and replacement. The REE patterns of analysed samples are characterized by light REE-enrichment, heavy-REE depletion and small negative Eu anomalies (Eu/Eu*=0.71-0.97). Enrichment of samples in LREE and depletion in HREE imply continental margin volcanic arc metaluminous I-type magmatism. These characteristics demonstrated that magma generation occurred in subducted oceanic lithosphere and metasomatized mantle wedge which followed by fractional crystallization and crustal contamination. On the tectonic discrimination diagrams, all samples fall within the volcanic arc granite field and subduction zone enrichment. Roodare granitoid have Low Sr (110-261ppm), Sr/Y and plot predominantly in the field of mantle-derived arc magmas (normal calc-alkaline rocks) and hence, are different from adakites.

Keywords: Roodare; Birjand; granitoid; geochemistry; tectonic setting.

*Corresponding author, Tel: (0561) 2502301, Fax: (0561) 2502041, Email: ssmohammadi2003@yahoo.com

متن فارسی اصل مقاله از صفحه ۳۳۹ تا ۳۵۲ در این شماره به چاپ رسیده است.