GEOLOGICAL AND MINERAL CHARACTERISTICS OF ZEOLITHIC TUFF TOPONICA DEPOSITS NEAR KOSOVSKA KAMENICA

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ABSTRACT: Zeolites are a group of natural and artificial inorganic compounds, which have specific physicochemical properties appropriate for industrial application. These minerals make a specific group of alumosilicates within tectosilicates because of their origin, chemical compositions, structural characteristics and application. This paper presents the results of mineralogical and crystallographic examination of zeolite tuff samples from the Toponica deposit. The deposit of zeolite tuff "Toponica" is located in the extreme eastern part of Kosmet near Kosovska Kamenica. The immediate geological structure of the zeolite tuff deposit consists of the Lower Miocene (M) clayey sandstone, the horizon of the white zeolite tuff (0.2 to 4.9 m) and the reclassified Miocene clays, clays and gravel. The basic mineral composition is the mineral clinoptilolite-Ca from the heylandite series.

Key words: Toponica, zeolitic tuff, clinoptilolite-heulandite group

INTRODUCTION

Studies have shown that zeolite deposits according to genetic characteristics belong to diagenetic deposits (volcanic-sedimentary) and hydrothermal-metasomatic deposits (with volcanic formations) [1-3]. In the deposits of marine and lake sediments, zeolites are mainly formed in the reaction of water with solid materials. The most present solid material (reactant) is volcanic glass, and the second reactant can be amorphous phase, poorly crystallized clays, montmorillonite, minerals of the plagioclase group, nepheline, quartz or silicon of biogenic origin. Clay minerals and zeolite minerals can be formed from the same material, and whether one or another mineral will crystallize will depend on the physico-chemical conditions of the given environment.

MINERALOGICAL AND CHEMICAL ANALYZES OF ZEOLITE TUFF

The tuff is white with yellow limonite scars on the surfaces of the cracks. It is crystalline in structure [6]. The examined tuffs show a pronounced zeolitization process and basically have a holocrystalline crystalline porphyry to vitrophyre texture, Figure 1.

Clinoptilolite in sedimentary rocks mainly occurs in the form of euhedral plates, of several microns in length and thickness of 1-2μ [4]. The morphological forms of clinoptilolite presented in Figure 2 (ad) have characteristic monoclinic forms, with pronounced anhedral forms.

Figure1. Elongated crystals of zeolite minerals in a zeolite tuff sample

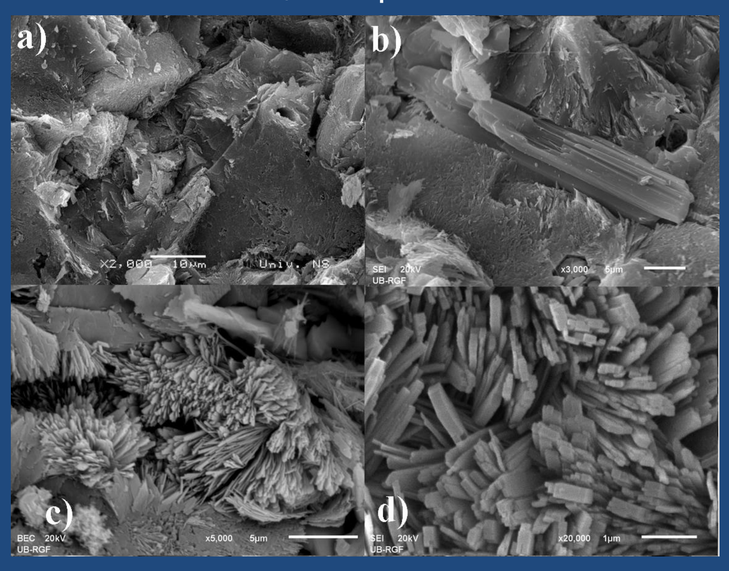

Figure 2. SEM micrographs of zeolite tuff.

Quantitative chemical analysis determined the chemical composition of the starting zeolite tuff, and is presented in Table 1.

(%) Oxide	Trial 1	Trial 2	Element (%)	Trial 1	Trial 2
SiO_2	67.5	60	Si	31.5	28.04
Al_2O_3	12	13.46	Al	6.3	7.1
Fe_2O_3	1	1	Fe	0.35	0.35
CaO	4.9	5.74	Ca	3.5	4.1
MgO	0.34	2.41	Mg	0.2	1.45
Na_2O	1.13	0.25	Na	0.83	0.18
K_2O	1.01	0.44	K	0.83	0.36
G annealing	12.65	17			

Table 1. Chemical composition of zeolite tuff of the Toponica deposit "

CONCLUSION

Based on the presented results, the zeolite tuff of the Toponica deposit contains a mineral from the heilanidite series, clinoptilolite, as the basic mineral component. The basic offline cation is calcium. The cation exchange capacity is 140 meq / 100g, which makes this mineral raw material extremely high quality and suitable for use in various industries.

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