

Genesis and Properties of Two Types of Analcime Occurrences in the SE of Ankara (Central, Turkey)

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The mineralogical and chemical composition of Middle to Upper Miocene Aktepe formation composed of pyroclastic sediments and lacustrine mudstones and carbonates were investigated. The study focused on analcime genesis and properties in the pyroclastic rocks and mudstones. The volcanic rock samples can be chemically classified into two subgroups as dacitic and andesitic those have an intermediate to high silica content and a high percentage of alkali cations.

The mineralogical composition and properties of the samples were determined by X-ray diffraction, scanning electron microscopy, optical microscopy, chemical analysis, and microprobe techniques. Analcime occurs in two different rock suits. Stratigraphically the second group is located at the bottom of the first group, consisting mainly of clinoptilolite-rich tuff and, analcime found mainly together with clinoptilolite and rarely erionite, whereas analcime-rich mudstones are not contained zeolite minerals other than analcime in the second group. The first group rocks are also contained mainly erionite and chabazite, associated with the parent glass. K-feldspar (sanidine), smectite, illite, dolomite and calcite are accessory minerals in the first group and alternated clay beds. Dolomite, feldspar, smectite are found as major mineral while calcite, illite and kaolinite are trace amount in muds- siltstones in the second groups. Analcime in the pyroclastic sediments commonly replaced early-formed zeolites, such as clinoptilolite or directly replaced glass. The composition of the second group analcime has lower Si content (about 33.0 to 33.5 Si per unit cell) than in the first group formed from as replacement glass (35.0 to 35.5 Si per unit cell).

Analcime-rich in mudstones and associated with sand-, siltstones, and carbonate layers contain about 50 % analcime, so they look like analcimolite. The analcime was not formed from precursor zeolites derived from alteration of volcanic material in saline and alkaline lake water. It may be occurred as chemical precipitation in the second group. Analcimolite layer contains much more dolomite and smectite than the other minerals, and no fossils. Strongly alteration of the feldspar and clay minerals i. e., especially smectite and partially illite and kaolinite in the analcime-rich sediments which produced Si and Al in a saline and alkaline environment, provided source for the formation of analcime in the marginal part of the Lake Tuzgölü when it was strongly saline and alkaline.