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FUZZY LOGIC METHOD OF MINERAL IDENTIFICATION BY CHEMICAL COMPOSITION

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Abstract. The paper describes the method of identification of silicate minerals by their chemical composition. The review and comparison of existing approaches to mineral identification is given. The method using the fuzzy logic for identification is proposed. This approach takes into account the high variability of individual elements in the mineral composition without affecting the overall accuracy of identification. Mineral compositions are described by the sets constraints written in a special formal language. These sets include constraints on individual elements and their groups, on impurities, and on the order of elements in exchange groups. The threshold value was estimated with usage of the geochemical data set. To increase the number of identified minerals, the special tool was created that automatically converts the crystal-mineral formula to a set of constraints. The software that implements this method is available as a web-application and allows mineral identification with existing constraint sets or user-created sets.

Keywords: mineral identification, fuzzy logic, web-application, isomorphism, solid solutions.

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