

SYNTHESIS OF DIFFERENT STRUCTURAL TYPES OF ZEOLITES IN THE HALLOYSITE-DOLOMITE-OBSIDIAN SYSTEM

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Abstract. Gismondine, laumontite and levyne type zeolites have been synthesized based on the natural minerals of Nakhchivan and the optimal crystallization conditions have been established. The influence of temperature, alkaline solution concentration, ratio of starting components and time of processing on the synthesis process has been studied. The mineral resources of Nakhchivan – halloysite deposits of Pirigel, dolomite deposits of Negram and obsidian deposits of Zangezur served as samples. The initial components and the reaction products have been examined by X-ray diffraction, thermogravimetric and elemental analysis. The optimal conditions for the synthesis of gismondine zeolite with a 100% crystallinity are as follows: temperature of 200°C, alkaline solution of 2 N NaOH, ratio of the initial components of halloysite (H):dolomite (D):obsidian (O)= 1:1:1, processing time of 50 hours. The optimal conditions for laumontite synthesis are: temperature of 220°C, alkaline solution of NaOH of 1 N, H:D:O= 1:3:1, processing time of 75 hours. The optimal conditions for levyne are: temperature of 200°C, alkaline solution of KOH of 4 N, H:D:O= 2:1:2, processing time of 100 hours. It was found that changes in the temperature, alkalinity, ratio of starting components and time of processing of the reaction have different effects on the rate of formation of products, on their degree of crystallinity and on the phase purity of the obtained zeolite.

Keywords: hydrothermal synthesis, zeolite, gismondine, laumontite, levyne.

Received: 13 January 2020/ Revised final: 21 April 2020/ Accepted: 26 April 2020
