

Modification of Bulgarian natural zeolite (clinoptilolite) and its use as catalyst in some environmental protection reaction.

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Ozone is used as an oxidant for waste water treatment and drinking water sterilization. The exhaust gases contain residual ozone, which is above the acceptable value, and an additional air pollution problem must be solved. The most effective method for nullification of ozone is via heterogeneous catalytic decomposition [1]. The Bulgarian clinoptilolite is a natural zeolite with HEU-type framework. As a member of the zeolite class, clinoptilolite can be used as catalyst support, adsorbent and ion-exchange medium [2]. Ion-exchanging process of natural zeolite clinoptilolite (CL) with Zn, Mn, Cu and Ag ions was made; the existence of mentioned transition metals in the samples (Zn-CL), (Mn-CL), (Cu-CL) and (Ag-CL) was detected by D.C. arc-AES. XRD patterns show that after exchanging the HEU zeolite structure is kept (Figure 1). These samples were tested as catalysts for ozone decomposition at ambient temperature. Zn-CL was not active, Cu-CL shows about 15 % and Mn-CL about 32 % conversion at the beginning of ozonation. Deactivation of these investigated samples was observed. Very high catalytic activity Ag-Clinoptilolite showed - up to 89%. (Figure 2)

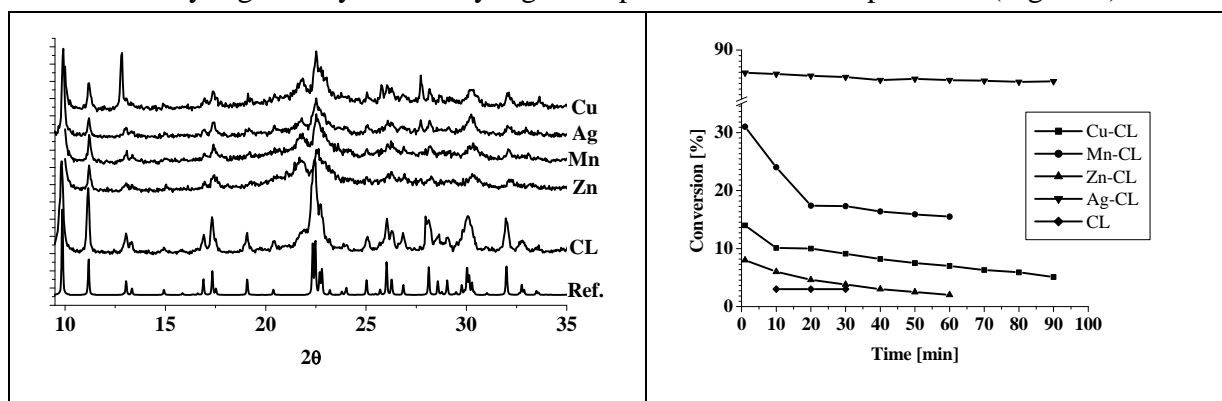


Figure 1. XRD of samples and reference diffraction (Ref.) generated from <http://www.iza-structure.org/databases/>.

Figure 2. O₃ conversion over natural (CL) and different ion-exchanged media.

References

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2. N. Lihareva, L. Dimova, O. Petrov and Y. Tzvetanova, *Microporous Mesoporous Mater* 130 (2010) 32.