

Ce-modified Beta zeolites as catalysts for β -pinene oxide isomerization

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β -Pinene oxide is a highly reactive molecule. Even under mild conditions, it can be transformed into a number of isomeric forms, which can be divided into 2 types (Fig. 1). The most important forms include myrtenol and myrtanal, which can be put in the M group of β -pinene oxide isomerization products, and perillyl alcohol, which belongs to the P product group. Less significant P products may also include anthemol and isoperillyl alcohol. These substances and some other isomers are used mainly in the food and fragrance industries. Perillyl alcohol is also used in the pharmaceutical and veterinary industries mainly for its ability to regulate resistant pathogens [1].

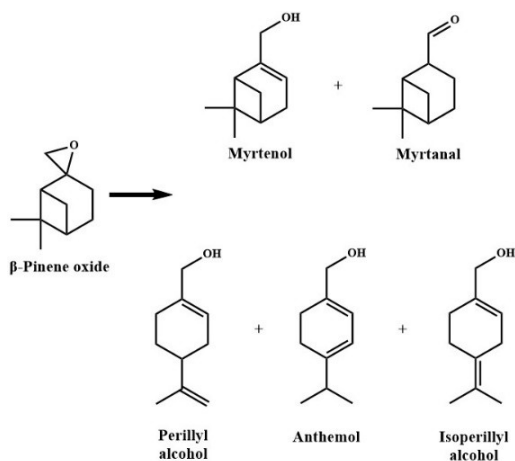


Fig. 1: Isomerization of β -pinene oxide to give M and P products

Two Beta-type zeolites differing in $\text{SiO}_2/\text{Al}_2\text{O}_3$ ratio: β -38 and β -25, which were modified by impregnation of CeO_2 on its surface, were tested as β -pinene oxide isomerization catalysts. The influence of CeO_2 content on the reaction course was studied. Besides the type of catalyst, the reaction course is affected by the reaction conditions as well. Therefore, the influence of the chosen solvent, temperature and amount of the catalyst and its possible reuse was also studied.

Under studied reaction conditions, the highest conversion of 90 % and selectivity of 83 % to P products was achieved in DMSO as solvent with 10 wt% of β -38 catalyst modified with 7% of CeO_2 .

1. VYSKOČILOVÁ, E.; MALÝ, M.; AHO, A.; KRUPKA, J.; ČERVENÝ, L. The solvent effect in β -pinene oxide rearrangement. Reaction Kinetics, Mechanisms and Catalysis [online]. 2016, 11 February, 118, 235–246