process is selective for the production of $C_4$ oxygenate compounds and the product is obtained in high yields.

Summary

In one aspect of the present disclosure, there is provided a process for the preparation of one or more $C_4$ oxygenate compounds from a composition comprising $C_{1-3}$ oxygenate compounds, wherein the process is carried out in the presence of a crystalline microporous material comprising a ring pore structure selected from one or more of the group consisting of an eight-membered ring pore structure and a ten-membered ring pore structure.

In another aspect of the present disclosure, there is provided a use of erythritol prepared according to the process disclosed herein, for one or more of the group consisting of a foodstuff, a sweetener and the preparation of furan.

In a further aspect of the present disclosure, there is provided a use of $C_4$ oxygenate compounds prepared according to the process disclosed herein for the preparation of one or more of the compounds selected from the group consisting of methyl vinyl glycolate, 2-hydroxy-4-methoxybutanoate, 2-hydroxy-4-methoxybutanoic acid, 1,4-butandiol and α-hydroxy-γ-butyrolactone.

In another aspect of the present disclosure, there is provided a use of $C_4$ oxygenate compounds prepared according to the process disclosed herein for the preparation of one or more α-hydroxy methionine analogues.

Disclosure of the invention

It has now been discovered that glycolaldehyde may be selectively transformed into $C_4$ oxygenate compounds in the presence of a crystalline microporous material comprising a small- or medium-pore structure. The reaction proceeds in a high yield. Additionally, it is possible for the reaction to proceed in the presence of additional compounds to selectively form the desired $C_4$ oxygenate compounds.

The invention is further defined by a process for the preparation of $C_4$ oxygenate compounds from a composition comprising $C_{1-3}$ oxygenate compounds, wherein the process is carried out in the presence of a crystalline microporous material comprising a small- or medium-pore structure.

$C_4$ oxygenate compounds may be known as $C_4$ sugars or oxygenated compounds with a carbon chain length of four carbon atoms. The molecular formula of the $C_4$ oxygenate compounds may be $C_4H_8O_4$. $C_4$ oxygenate compounds may also be described as tetroses. The $C_4$ oxygenate compounds are selected from one or more of the group consisting of threose, erythrose and erythrulose.

In one embodiment of the invention compositions comprising $C_{1-3}$ oxygenate compounds comprise one or more oxygenate compounds selected from the group consisting of $C_1$ oxygenate compounds, $C_2$ oxygenate compounds and $C_3$ oxygenate compounds. $C_1$, $C_2$ and $C_3$ oxygenate compounds means compounds