Mechanism and Stereoselectivity of Zeolite-catalysed Sugar Isomerisation in Alcohols

Glucose isomerisation to fructose can occur by different pathways and the mechanism of zeolite-catalysed glucose isomerisation in methanol has remained incompletely understood. Herein, the mechanism is studied using an 1H-13C HSQC NMR assay resolving different fructose isotopomers. We find that zeolite-catalysed glucose isomerisation proceeds predominantly via a hydride shift into the pro-R position of fructose, thus resembling the stereoselectivity of the enzymatic isomerisation process.