Joseph Zeaiter et al., J Pet Environ Biotechnol 2014, 5:4
http://dx.doi.org/10.4172/2157-7463.S1.006

OMICS Group Conferences
Accelerating Scientific Discovery

2nd World Congress on
Petrochemistry and Chemical Engineering
October 27-29, 2014 Embassy Suites Las Vegas, USA

Mathematical modelling of the aqueous phase reforming of sorbitol

Farid Aiouache[1], Lisa M. McAleer[1], Quan Gan[2], Ala'a H. Al-Muhtaseb[1], Joseph Zeaiter[3] and Mohammad N. Ahmad[1,3]
[1]Queen's University Belfast, UK
[2]Sultan Qaboos University, Oman
[3]American University Beirut, Lebanon

This work presents a kinetic model for the aqueous phase reforming of sorbitol that uses a lumping scheme of intermediates and describes the complex path to gas products via a reforming route and liquid oxygenate route including hydrodeoxygenation, decarbonylation and dehydrogenation reactions. The model was tested at temperatures ranging from 473 to 523 K, using monometallic Ni and bimetallic Ni-Pd catalysts supported on γ-Al_2O_3, ZrO_2 and CeO_2. The model revealed that the relevant competing paths were a function of the composition of catalyst and the conversion to the carbon gaseous products. Paths of reforming and CO_2 methanation were more important than decarbonylation and hydrodeoxygenation at small conversions for all catalysts whereas the hydrodeoxygenation-decarbonylation towards alkanes release was more competitive than the reforming at high conversions with Ni/Al_2O_3 and Ni-Pd catalysts supported on ZrO_2 and CeO_2 but was still less competitive with Ni-Pd catalyst supported on γ-Al_2O_3.

jz08@aub.edu.lb