



Valorisation of glycerol by condensation with acetone over silica-included heteropolyacids

P. Ferreira^a, I.M. Fonseca^b, A.M. Ramos^b, J. Vital^b, J.E. Castanheiro^{a,*}

^a Centro de Química de Évora, Departamento de Química, Universidade de Évora, Rua Romão Ramalho, No. 59, 7000-671 Évora, Portugal
^b REQUIMTE, CQFB, Faculdade de Ciências e Tecnologia, Universidade Nova de Lisboa, 2829-516 Caparica, Portugal

ARTICLE INFO

Article history:

Received 20 January 2010

Received in revised form 10 May 2010

Accepted 15 May 2010

Available online 24 May 2010

Keywords:

Glycerol

Acetalisation

Heteropolyacids

Silica

ABSTRACT

The acetalisation of glycerol was studied using heteropolyacids, immobilized in silica, as catalysts, at 70 °C. The main product of glycerol acetalisation was solketal. The tungstophosphoric (PW), molybdophosphoric (PMo), tungstosilicic (SiW) and molybdosilicic (SiMo) acids were immobilized in silica by sol–gel method.

It was observed that the catalytic activity decreases in the series: PW.S > SiW.S > PMo.S > SiMo.S. All catalysts exhibited good values of selectivity to solketal (about 98% near complete conversion). The effect of different parameters, such as catalyst loading, molar ratio of glycerol to acetone and temperature on the glycerol acetalisation, over PW.S catalyst, was studied. Catalytic stability of the PW.S, SiW.S, PMo.S and SiMo.S catalysts was evaluated by performing consecutive batch runs with the same catalyst sample. After the third batch, it was observed a stabilisation of the initial activity.

© 2010 Elsevier B.V. All rights reserved.