Título:

Influence of the preparation method on performance of Cu-catalysts for glycerol valorization

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Abstract:

Glycerol is a chemical product which has several applications in many fields as: pharmaceutical, cosmetic, food and chemical industries. It can be obtained as by-product from oleochemical plants as well as transesterification reaction in biodiesel plants [1].

Despite of the multiple uses of glycerol, its generation as by-product is increasing faster than its consumption in recent years. This fact, together with the unstoppable climate change, due to the consumption of fossil fuels encourage researchers to optimize the valorization of glycerol.

Glycerol can be used in the production of different value-added products such as: 1,3-propanediol, 1,2-propanediol, acetol, hydrogen, syngas… [2]. Acetol and 1,2-propanediol are value-added products which have many applications in different fields, especially, in chemical industry, as intermediate, and in food industry, as flavouring agent [3]. Acetol, as other similar products like ketones, reacts with furan compounds via aldol condensation, to obtain intermediate compounds that can be used as aviation´s fuels [4].

This work shows the effect of the preparation methods of Cu-catalysts on the yield, selectivity and carbon selectivity to liquid products for the dehydration of glycerol, as well as, in the properties of the catalysts. Catalysts were characterized via: XRD, TPR, nitrogen adsorption and ICP-OES.

The liquid dehydration of glycerol was conducted in a fixed-bed reactor at 33 bar and 227 ºC with catalysts that had been sieved between 160-315 μm. For the screening tests, 1 g of catalyst (diluted with sand) were contacted with a 1 mL/min flow rate which consist of 10 %wt glycerol and 90 %wt water. All the catalysts were previously-reduced with 100 mL/min of H_2 flow at their reduction temperature which was obtained via TPR analysis.

Acknowledgments

The authors wish to express their gratitude to Project PID2020-114985RB-I00 financed by MCIN/AEI/10.13039/501100011033 and the pre-doctoral aid granted to Francisco Maldonado Martín PRE2021-100578 financed by MCIN/AEI/10.13039/501100011033 and by FSE+.

The authors are also grateful for the help of the General Research Support Service-SAI University of Zaragoza, as well as the Government of Aragon (Ref. T22_23R).

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