



Glycerol acetylation over dodecatungstophosphoric acid immobilized into a silica matrix as catalyst

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ABSTRACT

The esterification of glycerol with acetic acid was carried out over dodecatungstophosphoric acid (PW) immobilized into a silica matrix. The products of glycerol acetylation were monoacetin, diacetin and triacetin. The immobilization of PW into silica was carried out by two different techniques: sol-gel and impregnation methods. The catalysts prepared by sol-gel method will be denoted as PW-*in*-S while the catalysts prepared by impregnation will be denoted as PW-*on*-S. The catalysts were characterized by nitrogen adsorption at 77 K, FTIR, XDR and ICP-AES. A series of PW immobilized into silica with different PW loading were prepared. It was observed that the catalytic activity increases with the amount of PW immobilized into silica, either by the sol-gel method or by the impregnation method.

High values of selectivity to diacetin were obtained with all catalyst.

The effect of various parameters, such as, reaction temperature, catalyst loading, molar ratio of glycerol to acetic acid and reusability of PW-*in*-S2 were studied to optimize the reaction conditions.

The catalytic stability of the PW-*in*-S2 was evaluated by performing consecutive batch runs with the same catalyst sample. It was observed a stabilization of the catalytic activity.

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