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## Gas-phase dehydration of glycerol over WO<sub>x</sub>/ZrP catalysts.

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### Abstract

Solid acid catalysts containing WO<sub>x</sub>/ZrP have shown high conversion and selectivity for acrolein in the dehydration of glycerol at 300°C in the presence of water. 30wt% WO<sub>x</sub>/ZrP catalyst has shown high selectivity to acrolein (about 86%) with total conversion of glycerol. The physico-chemical properties of the catalysts were investigated by X-ray diffraction, pore size distribution, FT-IR, pyridine adsorbed FT-IR and NH<sub>3</sub>-temperature programmed desorption methods to understand the role of WO<sub>x</sub> supported on ZrP in the dehydration reaction. The XRD results suggest that ZrP is found to be amorphous below 30% (w/w) tungsten loading on the support. TPD results suggest that the acidity increases with tungsten oxide loading upto 30wt% WO<sub>x</sub>/ZrP and did not change appreciably at higher loadings. Glycerol conversion and acrolein selectivity were mainly depend on the fraction of moderate acidic sites. The catalyst with 30wt% WO<sub>x</sub>/ZrP possesses higher larger number of moderate acidic sites responsible for its highest dehydration activity and acrolein selectivity.

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**Key words:** WO<sub>x</sub>/ZrP, moderate acidic sites, dehydration, glycerol and acrolein.