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Supported polyoxometalates: tailoring and sustainable glycerol valorization

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Polyoxometalates (POMs) are comprised of class of inorganic complexes of unrivaled versatility and structural variation, with applications in many fields of science. Modifications of parent POMs are likely to help in development of new generation of catalysts with enhance properties of acidity, redox properties and stability. In the present talk, the designing of heterogeneous catalysts based on parent as well as lacunary silicotungstate and mesoporous supports as well as zeolites will be discussed. Glycerol is formed as a by-product (~10 wt.%) during the biodiesel production leading to an increase of crude glycerol in the market. The high manufacturing cost of biodiesel raises the need to study the uses of glycerol as a renewable feedstock for synthesis of value added fine chemicals. Amongst all, cyclization of glycerol via acetalization as well as carboxylation of glycerol are the most important reactions as the formed products have direct applications in fragrances, in cosmetics, food and beverage additives, pharmaceuticals, in detergents, in lacquer industries and as ignition accelerators and antiknock additives in combustion engines and in port wine productions. The present talk describes the new prospects for conversion of glycerol into value added products by choosing viable reaction conditions with parent as well as lacunary silicotungstate anchored to mesoporous as well as zeolites, as catalysts. The unique catalytic activity of all the catalysts is due to the combination of well-defined order, channel framework, homogeneous dispersion of the active sites, as well as strong acidity. All these characteristics also make them promise environmentally benign heterogeneous catalysts.

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