

## Chapter 4

# Conclusive Remarks

In the present book, we have discussed an overview of a part of research conducted in our group on the development of heterogeneous catalysts for oxidation reactions under solvent free green reaction conditions. Unique properties of POMs permit designing at molecular level. Special attention was focused on the designing and application of POMs based on phosphomolybdates. As a part of development of new phosphomolybdates materials (1) synthesis and isolation of  $\text{PMo}_{11}$  was described. Also, stabilization of  $\text{PMo}_{11}$  was successfully done by supporting it to suitable supports (2) one-pot synthesis of  $\text{PMo}_{11}\text{M}$  ( $\text{M} = \text{Mn}, \text{Co}, \text{Ni}, \text{Cu}$ ) was also discussed. These procedures open up new synthetic routes for development of other POMs based material.

The synthesized materials have been proved to be successful heterogeneous catalysts for oxidation alcohol with molecular oxygen under solvent free green conditions. In all cases, moderate-to-good conversion with very good selectivity of desire products as well as high TON was achieved. All the catalysts can be successfully regenerated and reused up to 4 cycles without any significant loss in conversion as well selectivity. The advantages of reusable and sustainable catalysts with molecular oxygen for oxidation under solvent free conditions make this methodology interesting from an economic and an ecological point of view. However, present catalytic systems are not applicable for oxidation of long chain (C8 onwards) alcohols. Thus, future target will need stagiest to overcome such problems so as to open up a new possibility for the use of these catalysts for many practical oxidations.