

Novelty of the work

- *Tuning* the properties of parent *phosphotungstate* (PW₁₂) at molecular level, to obtain *lacunary phosphotungstate* (PW₁₁).
- *Designing and development* of bifunctional heterogeneous catalysts by anchoring PW₁₂/PW₁₁ to MCM-41 and MCM-48.
- Industrial process for *Biodiesel production* has been proposed after successful *scale up*.
- *Waste to best transformations* of *glycerol* by oxidation to give value added products was accomplished over synthesized catalyst.
- One pot bi-functional oxidative esterification of aldehyde was achieved under mild conditions for the *first time*.