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## In situ characterization of polycrystalline oxides for selective oxidation applications

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Selective oxidation of C3 molecules to acrylic and methacrylic acids are conducted with Mo-V-W oxides with various additives (MMO systems). Heteropoly acids (HPA) and multi-phase systems with phase cooperation are utilised. The contribution will show that both the HPA and the multi-phase systems are precursor systems which transform with varying degrees of efficiency into an active form of a single phase which can be described in its essence as a  $\text{Mo}_5\text{O}_{14}$  structure which does not exist in its pure form but requires stabilizing heteroatoms. By removing detrimental

foreign phases of molybdenum oxides the efficiency and stability of these apparently so complex catalysts can be improved substantially.

These results are only possible thanks to the application of in-situ structural and spectroscopic probes augmented with high-resolution electron microscopy. A selection of results will be used to illustrate the application of EXAFS, X-ray diffraction, XAS, Raman and UV-VIS methods in the description of the active state of the MMO catalysts.