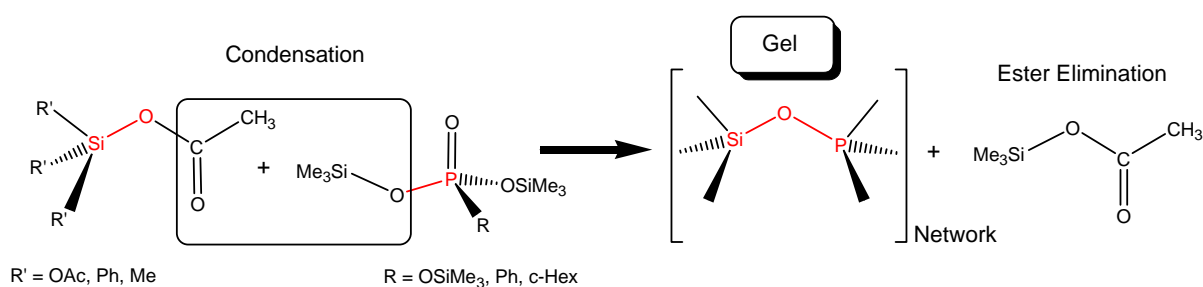


Synthesis of silicophosphates by non-hydrolytic sol-gel reactions

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Silicophosphates are widely used as advanced technology materials. Because of their high proton conductivity, special optical and electrical properties and biocompatibility they can be applied as heterogeneous catalysts, proton conducting electrolytes, optical glasses and biomaterials. The synthesis of these compounds by hydrolytic sol-gel methods poses considerable obstacles, the reason being that Si–O–P bonds are unstable under hydrolytic conditions and therefore phase separation to silica and phosphoric acid occurs. As a solution, we have recently developed a non-hydrolytic sol-gel method based on ester elimination starting from silicon(IV) acetate and *tris*(trimethylsilyl)phosphate (Scheme).



This reaction principle provides porous (up to $570 \text{ m}^2 \text{ g}^{-1}$) and homogeneous silicophosphate xerogels and allowed obtaining of hybrid organic-inorganic materials based on silicophosphate skeleton as well. Finally we were able to prepare nanocrystalline and mesoporous silicon phosphates with the use of structure directing agent. The condensation reaction, structure of resulting materials, effects on porosity and use of prepared silicophosphates in catalytic test reactions will be described in detail.