## Mixed Metal Oxide Nanoparticles – Synthesis and Characterisation

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Many naturally occurring mixed metal oxide materials are known, some of which have also been synthesized at high temperatures and pressures in laboratories. Several of these oxides offer potential applications as catalysts. Syntheses involving high temperatures and pressures are, however, detrimental to the efficiency of catalysts as such conditions lead to the formation of large particles, with a corresponding decrease in active surface area. Additionally, in purely scientific terms such mixed oxide species are interesting to study as the surface energetics of nanoparticles of mixed metal oxides may serve to stabilize phases and states that would not be stable in the bulk material.

In the work presented here mixed metal oxide nanoparticles containing titanium and tungsten were synthesized. The aim was to obtain materials that were new crystallographic forms containing tungsten and titanium ions within the same crystal matrix and not a solid solution of tungsten oxides and titanium oxides.

Nanoparticles were synthesised using the gel-polymer method as well as co-precipitation and were characterised using TEM, PXRD and XPS. The results indicate that the tungsten ions are located within the anatase matrix and have pronounced effects on the physical properties of the material.

Keywords: mixed oxides, nanoparticles, TEM x-ray structure determination