Abstract

This thesis is focused on carbide ceramics synthesis, more specifically on the synthesis of a Ti_2AlC MAX Phase carbide using solution chemistry rather than powder metallurgy. Chloride and nitrate precursors have been used as a source of metals and citric acid as a source of carbon for carbothermal reduction and as a complexing agent. A new route of precursor synthesis has been developed based on peroxo-titanic acid, which helps retain aluminium. The syntheses were performed using the SPS facility to ensure high heating rates. Al_4C_3 and TiC carbides and their mixtures were prepared successfully. However, the Ti_2AlC phase was not synthesized under used conditions. The phase composition, structure and grain sizes of the samples were investigated by powder X-ray diffraction, X-ray fluorescence and electron microscopy. The contents of carbon in the precursors were determined by thermogravimetric analysis.