Abstract

This thesis aimed to streamline the method of the preparation of high entropy carbides. The simplification of synthesis and expends reduction were achieved using sol-gel method instead of using commercial starting powders. As precursors of transition metals, the chlorides ($TiCl_3$, $TaCl_4$, $HfCl_4$ a $NbCl_5$) and chlor-oxide ($ZrOCl_2$) were used. The source of carbon was citric acid. All reactants were mixed in solution and dried to gel. The pyrolysis at 800 °C afterwards leads to creation of the amorphous carbon, which embedded the transition metal oxide nanoparticles. The carbothermal synthesis was completed in *Spark plasma sintering* device at 1400 °C, 1600 °°C and 1900 °C. Formation of high entropy carbide phase was achieved at 1600°C, which is almost 400 °C less than previously reported in literature. Intermediate and final products were characterized with powder X-Ray diffraction, scanning electron microscopy and products, in addition, were characterized with transmission electron microscopy and elements mapping.

Key words: high entropy carbides, carbothermal reduction, high temperature ceramics, sol-gel method,