Short communication

Solid Oxide Membrane-Assisted Controllable Electrolytic Production of TaC Nanoparticles in Molten CaCl_2

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The direct electrolytic production of TaC nanoparticles from a $\text{Ta}_2\text{O}_5/\text{C}$ precursor in molten CaCl_2 by using solid oxide membrane (SOM) technology was investigated in this work. A $\text{Ta}_2\text{O}_5/\text{C}$ pellet pressed under 6 MPa was used as the cathode, and a yttria-stabilized zirconia (YSZ) tube filled with carbon-saturated liquid tin served as the anode to control the electrolysis process. The phase composition and morphology characteristics of the electrolysis products were investigated. The results show that TaC nanoparticles could be obtained directly from a $\text{Ta}_2\text{O}_5/\text{C}$ mixture in molten CaCl_2 at 1000 °C and 4.0 V within 4 h.

Keywords: SOM process; molten salt; electrolysis; TaC

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