

Synthesis of Ultra Fine TiC Powders by Carbothermal Reduction

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Abstract

Synthesis of nano TiC powder by carbothermal reduction procedure of TiO_2 was investigated. TiO_2 was mixed with carbon resin or carbon powder as reduction agent and then was reacted at 1500°C for 0 ~ 45 minutes under Ar atmosphere. The powders mixed with TiO_2 and carbon resin were conglomerated in the initial stage of the reduction and the unreacted TiO_2 was not found even at 5 minutes as reaction time. The fine TiC particles with a size of 80 nm were formed by complete reaction between Ti as reduction product and C at 15 minutes. However, the conglomerated particles were not observed in powders added with carbon powder as carbon source in the initial stage. The unreacted TiO_2 particles were conserved up to 15 minutes. Finally, TiC particles were formed and were partially grown above 20 minutes.