

عنوان مقاله:

Synthesis and characterization of TiB_2 nanopowder

محل انتشار:

اولین همایش بین المللی نانو تکنولوژی در فرآیندهای مهندسی (سال: 1402)

تعداد صفحات اصل مقاله: 6

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خلاصه مقاله:

In this research, TiB_2 powder was synthesized using the sol-gel process, resulting in nanometer-scale dimensions. Raw materials employed included titanium isopropoxide and trimethyl borate. Various analytical techniques, including DLS, Zetameter, XRD, FTIR, SEM, and DTA/TG, were employed to elucidate the mechanism of product formation in the sol-gel process. FTIR data indicated the presence of B-Ti and carbon-containing bonds within the $600\text{--}1650\text{ cm}^{-1}$ range in the prepared gel powder. DTA analysis revealed that the initial nucleation of TiB_2 particles occurred within the temperature range of 1300°C . XRD patterns confirmed the formation of the TiB_2 crystalline phase, which further progressed with increasing temperature, reaching up to 1400°C . Surface analysis of the synthesized particles indicated a specific surface area of approximately $153.42\text{ m}^2/\text{g}$, with porous and meso-sized surfaces. PSA results showed that the particle size distribution is in the range below 50 nm . SEM and TEM microstructural images provided visual evidence of the synthesis of TiB_2 particles smaller than 100 nm , characterized by a narrow and uniform distribution range.

کلمات کلیدی:

Titanium diboride, Synthesis, Sol-gel, Nanopowder, Mesoporous

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