

عنوان مقاله:

An Investigation on the Synthesis of MgO-ZrB₂ Nanocomposite by Mechanochemical Process

محل انتشار:

سومین کنفرانس بین المللی مطالعات میان رشته ای در نانو فناوری (سال: 1399)

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خلاصه مقاله:

In the present study, MgO-ZrB₂ nanocomposite was produced by the mechanochemical process of Mg, ZrO₂ and H₃BO₃ stoichiometry mixture. For this purpose, the powder mixture was mechanically milled for different milling times at ۳۵۰ and ۴۵۰ rpm in Ar atmosphere. The ball to powder ratio was ۱۰:۱. Also, to control the process and prevent the agglomeration and sticking of powders, process control agent was employed. The results of X-ray diffraction, Differential scanning calorimetry (DSC) and scanning electron microscopy showed that lower milling speed (۳۵۰ rpm) leads to gradually progress reaction in contrast with higher milling speed (۴۵۰ rpm) which cause to the combustion reaction. Also when the milling speed was ۴۵۰ rpm the Mg₂Zr₅O₁₂ was created which confirms combustion reaction has taken place. The average grain size of MgO and ZrB₂ after ۱۵ h of milling at ۴۵۰ rpm, were ۹۰ and ۴۷ nm, respectively. For determination of reaction activation energy, DSC was done for the sample milled for ۲۵ h at ۳۵۰ rpm with heating rates of ۲۰, ۳۰ and ۴۰ °C/min in Ar atmosphere. The estimated value for the reaction activation energy of reaction was determined about ۱۷۹.۵ kJ/mol.

کلمات کلیدی:

MgO nanocomposite, Mechanochemical reaction, DSC analysis, Activation energy

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