

## عنوان مقاله:

Effect of Particle Size on the Structural and Mechanical Properties of Al–AlN Nanocomposites Fabricated by Mechanical Alloying

## محل انتشار:

مجله مکانیک سازه های پیشرفته کامپوزیت، دوره 2، شماره 2 (سال: 1394)

تعداد صفحات اصل مقاله: 6

## نویسندگان:

H. Ghods - *Department of Materials Engineering, Islamic Azad University of Shahrood Branch, Shahrood, Iran*

S.A. Manafi - *Department of Materials Engineering, Islamic Azad University of Shahrood Branch, Shahrood, Iran*

E. Borhani - *Department of Nano-Technology, Nano-Materials Science and Engineering Group, Semnan University, Semnan, Iran*

## خلاصه مقاله:

Nanostructured Al composites with 2.5 wt.% aluminum nitride (AlN) were fabricated by powder metallurgy using mechanically milled aluminum powder mixed in a planetary ball mill with different particle sizes of AlN (50 nm and 1  $\mu\text{m}$ ) as reinforcement. After 20 h milling, the powders were die-pressed uniaxially in a steel die and then sintered at 670 °C for 2 h. The morphologies and properties of the obtained powders were determined by scanning electron microscopy and X-ray diffraction analysis. The results have indicated that the crystallite sizes of the composites decreased by increasing the milling time, resulting in sizes of 46 nm and 55 nm for the composites containing large (1  $\mu\text{m}$ ) and small (50 nm) AlN particles, respectively. After 20 h of milling, the microhardness of the nanocomposites with AlN particle sizes of 1  $\mu\text{m}$  and 50 nm were 101 and 122, respectively. The flexural strength of the composite containing smaller AlN particles (50 nm) was higher than that of the composite containing larger AlN particles (1  $\mu\text{m}$ ). The testing results have indicated that the strength and hardness properties of the composite containing smaller AlN particles are better than those of the composite with larger AlN particles.

## کلمات کلیدی:

Mechanical properties, Powder characteristics, Al/B<sub>4</sub>C nanocomposite, Mechanical alloying

## لینک ثابت مقاله در پایگاه سیویلیکا:

<https://civilica.com/doc/1026158>

