

عنوان مقاله:

Effect of Volume Fraction on Nanoindentation of Nanocomposite using FEM

محل انتشار:

دومین کنگره بین المللی علوم و فناوری نانو (سال: 1387)

تعداد صفحات اصل مقاله: 2

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خلاصه مقاله:

The purpose of the present work is to investigate the nanoindentation process of exfoliated nylon 66 /clay nanocomposite by numerical simulation. First the tensile test on a two dimensional representative volume element (RVE) is simulated and stress-strain curve is obtained. Then by using this stress-strain curve, the nanoindentation process of nanocomposite is simulated as an isotropic material. Finally, the effect of indenter angle is investigated. The simulation results for load-displacement curve show that there is a good agreement between the numerical and experimental results. Furthermore, it is observed that the simulation results of nanoindentation depend greatly on the mesh size but very little on the friction coefficient of indenter and specimen. Since many technologies have moved to ever smaller scale, characterization of the intrinsic mechanical properties of materials has become more difficult and complicated. Polymer/clay nanocomposites are polymeric materials that are reinforced by nanoclay particles whose dimensions are in the sub-micron scale and the particles are composed of stacks of 1 nm thick mono-layers whose in-plane dimensions range from 100 nm to 1000 nm. Nanoindentation testing at very low load is a successful technique for studying the mechanical properties of these materials. Finite element method (FEM) has been widely used for numerical simulation of hardness tests on bulk material in order to analyze its deformation response and investigate the influence of indenter geometry, friction and material elastic and plastic properties. In this paper, FEM was used to study the nanoindentation behavior of nylon 66 / clay nanocomposites.

کلمات کلیدی:

لینک ثابت مقاله در پایگاه سیویلیکا:

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