MS3S_12718

XXI International Congress of Theoretical and Applied Mechanics
Warsaw, Poland, August 15–21, 2004

Effective Thermoelastic Properties of Nanocomposites with Prescribed Random Orientation of Nanofibers

Ajit Roy(1), V.A. Buryachenko(2)

(1) *Air Force Research Laboratory, AFRL/MLBCM, WPAFB, USA*
(2) *University of Dayton Research Institute, Dayton, USA*

Nanocomposites are modeled as a linearly elastic composite medium, which consists of a homogeneous matrix containing a statistically homogeneous random field of spheroid nanofibers with prescribed random orientation. Estimation of effective thermoelastic properties of NC was performed by the effective field method (see Buryachenko, Appl. Mech. Review 2001, 54(1), 1-47). The independent justified choice of shapes of inclusions and correlation holes provides the matrix of effective moduli which is symmetric (in opposite to Mori-Tanaka approach). One estimates also the effective tensor of thermal expansion and stress concentrator factors. The interface fiber-matrix is modeled as a thick coating with cylindrically anisotropic varying thermoelastic properties.

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