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Homogenisation Models of Carbon Nanocomposites Mechanical Properties

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It is well known that single walled (SWCN) or multi walled carbon nanotubes (MWCN) offer a significant amount of stiffness (1–4 TPa) or strength comparing with those obtained for classical graphite or carbon fibres. However, those nanomaterials cannot form structures used for engineering purposes. On the other hand, nanocomposites made of SWCN or MWCN can loose a lot of their magnificent mechanical properties when will be joined with the matrix. Of course, the same situation is observed for classical carbon/graphite microcomposites. The general aim of the present paper is following: (1) to present the theoretical homogenisation models for the evaluation of the Young modulus values for nanocomposites reinforced with SWCN and MWCN, (2) to propose method of numerical modelling nanocomposites reinforced by SWCN and a polymer matrix, (3) to compare the obtained results with classical microcomposites in order to demonstrate advantages and disadvantages of both composite materials. Numerical results illustrate features and advantages of different models.

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