

Microstructure Dependency of the Material Properties: Simulation Approaches and Calculation Methods for Non-homogeneous Materials

Steel Research Int., 78 (2007) No. 10-11, 804-811, DOI: 10.2374/SRI07SP063-78-2007-804

Bobzin, K., Nickel, R., Parkot, D., Kashko, T.

Surface Engineering Institute, RWTH Aachen, 52056 Aachen

A big variety of the methods allow the prediction of the effective properties of non-homogeneous materials theoretically on the base of their microstructure and the properties of their components. One type of the commonly used methods - the methods of the mathematical homogenization - is described from the sight of the fundamental steps, characteristic for all such methods. The investigation procedure starts with the definition of the representative volume element (RVE). Usually, this step also includes some reworking of the microstructure descriptions, especially of those obtained experimentally. Not only size, but also geometry influences the resulting effective properties of the concerned material. This is shown on the example of the investigation of the atmospherically sprayed thermal barrier coatings. Realization of the micro-macro coupling including the generation of the macroscopic data from the microscopic ones is also discussed in the article.

[Full article](#)