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Prediction of the structural state of powder steels by multifractal parameterization

Shveyov A., Shveyov I., Shveyova T., Shveyova E., Galimov E., Sharafutdinova E., Belyaev A.
Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia

Abstract

The paper analyzes the current state of technology of powder steels and potential use in its objectives methodology of multifractal parameterization. The objects of study were samples microstructure of carbon steels. Tasks in the study necessitated the use of standard methods for determining the mechanical properties of the metal, the method of multifractal parameterization, metallographic examinations and standard methods of statistical processing of the results. The influence of the conditions for obtaining images of the microstructure (magnification, the type of etchant, plane grinding) on multifractal parameters uniformity and order was studied. The conditions for image acquisition, excluding distortions of multifractal parameters were found. It was found that the use of multifractal parameterization provides increased strength characteristics of up to 8-10% and significantly (up to 40%) to reduce the cost of optimization by reducing the number of experimental studies.

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Keywords

Forecasting, Multifractal parameterization, Powdered steel, Structural state