

عنوان مقاله:

(Prediction of Critical Temperatures in Steels Heat-treatment Operations with Trained Artificial Neural Network (ANN

محل انتشار:

دومین کنفرانس بین المللی و هشتمین کنفرانس ملی مهندسی ساخت و تولید (سال: 1386)

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خلاصه مقاله:

Determination of the temperature at which Austenite is formed is one of the important parameters in the heat treatment process. Chemical composition is an effective factor on these temperatures, particularly in steels that are used in various industries. In this research we have made an attempt to determine these temperatures based on the chemical composition of the steel. Martensite phase and its formation are quite attractive and important in industrial steels for reasons of having good properties such as high strength and high hardness. As such, determining the martensite formation start temperature in steel heat treatment operations is extremely important. Some parameters including chemical composition and grain size are effective factors on this temperature. In this investigation, we have made an attempt to determine this temperature with regard to chemical composition of steels. The technique used for this purpose is feedforward Artificial Neural Network (ANN) with the Back Propagation (BP) learning algorithm. A comparison is made between Ac_1 , Ac_3 temperatures predicted with this model and those from the empirical equation as well as the experimental values obtained from costly and time-consuming tests in scientific and industrial centers for various steels. This comparison indicates that at Ac_1 , a better agreement exists between the ANN-predicted results and experimental values than the results from the empirical equation and experimental values. At Ac_3 , the results from the empirical equation are closer to those of the experimental than those predicted from the ANN. This was due to the dispersion of the data set used. A comparison is made between the M_s temperatures predicted with this model and those from the empirical equation as well as the experimental values obtained from costly and time-consuming tests in scientific and industrial centers for various steels. This comparison indicates that a better agreement exists between the ANN-predicted results and experimental values than the results from the empirical equation and experimental values.

کلمات کلیدی:

,Austenite, martensite, Artificial Neural Network, Heat-treatment

لینک ثابت مقاله در پایگاه سیویلیکا:

