Prediction of Layer Thickness in Molten Borax Bath with Genetic Evolutionary Programming

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In this study, the vanadium carbide coating in molten borax bath process is modeled by evolutionary genetic programming (GEP) with bath composition (borax percentage, ferro vanadium (Fe-V) percentage, boric acid percentage), bath temperature, immersion time, and layer thickness data. Five inputs and one output data exist in the model. The percentage of borax, Fe-V, and boric acid, temperature, and immersion time parameters are used as input data and the layer thickness value is used as output data. For selected bath components, immersion time, and temperature variables, the layer thicknesses are derived from the mathematical expression. The results of the mathematical expressions are compared to that of experimental data; it is determined that the derived mathematical expression has an accuracy of 89%.

Key words: VC-Coating; TD Diffusion; Borax Bath; Genetic Evolutionary Programming.