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MATHEMATICAL MODEL FOR HEATING OF PARTICLE AT FORMATION OF THE THERMO EXFOLIATED GRAPHITE IN THE CONDITIONS OF RADIANT HEAT EXCHANGE

A mathematical model for heating by radiant heat transfer of a single particle of intercalated graphite during the process of its structural transformation in thermo-exfoliated graphite is developed.

A procedure for building the mathematical model, based on approximated numerical iterations with the first-order finite differences scheme, is presented.

It is found that in thermal shock the temperature field gradients within the particle are negligible small under conditions of the required accuracy of the calculating model and heat propagation within the particle is practically instantaneous. Dependencies of changes in the temperature and structure of particles on the time of the effect of heat irradiation on the particle are derived. A dependency of the time interval of a complete structural transformation of intercalated graphite in thermo-exfoliated that is derived under different parametric conditions.

The procedure presented makes possible calculating the basic parameters of thermal processes to design technological plants of the thermo-exfoliated graphite production and assesses numerically the possibility of increasing the process intensity when the brightness temperature of the heater is elevated.

Keywords: *intercalated graphite, thermo-exfoliated graphite, numeral iteration, radiant heat transfer, emissivity factor, asymptotic approximation.*

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