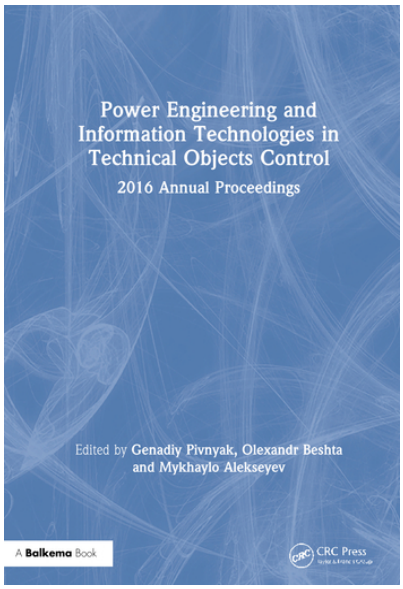

Mathematical modelling of electric conductivity of dense and fluidized beds

M. Gubinskyi, S. Fiodorov, Ye. Kremniova [1], O. Gogotsi [2], T. Vvedenska [3]

[1] *State Higher Educational Institution "National Metallurgical Academy of Ukraine", Dnipro, Ukraine*

[2] *Materials Research Centre, Kyiv, Ukraine*

[3] *State Higher Educational Institution "National Mining University", Dnipro, Ukraine*

ABSTRACT

Carbon materials processed in electrical thermal furnaces with dense and fluidized beds are widely used in machine building and metallurgical industry (Gasik & Gasik 2007; Fedorov et al). Their operational principle is based on emitting joule heat in material volume by passing electric current through it. However, in spite of its commonality, the physical idea of the bed electric conductivity (Lakomskyi 2008; Borodulia 1973; Gupta, Sathiyamoorthy 1999), as the main mechanism of heating and processing carbon materials in high temperature electrothermal facilities, requires specification of a number of topical issues related to the impact produced by the dense phase, granulometric composition of raw

material, the process temperature, the temperature of contact surfaces and geometry of the working space. To solve these tasks, it is necessary to apply a systematic approach comprising complementary elements of empirical and theoretical analyses. The aim of this work was to develop a generalized mathematical model of the bed electric conductivity.

Power Engineering and Information Technologies In Technical Objects Control – Pivnyak, Beshta & Alekseyev (eds) © 2016 Taylor & Francis Group, London, ISBN 978-1-138-71479-3