Miroslaw Kwiatkowski, Int J Petrochem Res. 2019
http://dx.doi.org/10.18689/2638-1974.a3.004

New Numerical Method as a Tool for Analysing the Microporous Structure of Carbon Materials on the Basis of Multiple Gaseous Adsorption Isotherms

Miroslaw Kwiatkowski
AGH University of Science and Technology, Poland

The work presents the results of the research on the application of the new numerical method with the fast multivariate identification procedure as a tool for analysing the microporous structure of the carbonaceous materials on the basis of high-temperature multiple carbon dioxide and methane adsorption isotherms. The analysis involved double and triple adsorption isotherms obtained in various temperatures which is a unique approach to microporous structure of activated carbons analysis. The proposed method with an implemented of the fast multivariate method of fitting theoretical mathematical models to empirical adsorption isotherms can successfully be applied in analysing the structure of the carbonaceous materials on the basis of high-temperature carbon dioxide and methane adsorption isotherms, providing complex information about the microporous structure of the mentioned materials. An simultaneous analysis of two and three adsorption isotherms enhances the reliability and accuracy of the determined parameters of the microporous structure not withstanding an increase in the number of parameters determined at the same time, which testifies to the high quality of the numerical procedures applied and the assumptions behind the mathematical models of adsorption on heterogeneous surfaces.

Acknowledgments: The work was financed from the Research Subvention from the Polish Ministry of Science and Higher Education for the AGH University of Science and Technology in Krakow No. 16.16.210.476.

Biography:

Dr. hab. eng. Mirosław Kwiatkowski in 2004 obtained Ph.D. degree from the Faculty of Energy and Fuels at the AGH University of Science and Technology in Kraków, Poland and in 2018 D.Sc. degree from the Faculty of Chemistry at the Wrocław University of Technology, Poland in the discipline: chemical technology. Currently Dr. hab. eng. Mirosław Kwiatkowski is working an assistant professor at the AGH University of Science and Technology at the Faculty of Energy and Fuels. His published work includes more than 40 papers in reputable international journals and 90 conference proceedings.