## Powder metallurgy fundamentals and sintered materials

Leszek A. Dobrzański\*, Grzegorz Matula Institute of Engineering Materials and Biomaterials Faculty of Mechanical Engineering, Silesian University of Technology, Konarskiego St. 18a, 44-100 Gliwice, Poland \* Corresponding e-mail address: leszek.dobrzanski@polsl.pl

## Abstract

**The aim of the book**: The aim of the book is to present general knowledge on powder metallurgy, taking into especial consideration tool materials made with the use of that technology. The book has been written on the basis of literature review and is a result of many-year didactic experiences of both Authors in that field. The motivation to its publication is also an intention to present the selected results of many-year own researches carried out in the Division of Materials Processing Technologies, Management and Computer Techniques in Materials Science of the Institute of Engineering Materials and Biomaterials of the Silesian University of Technology and experience gained during the realisation of numerous domestic and international research projects, e.g. within the cooperation with one of the best European research centres dealing with powder metallurgy – the University of Carlos III in Madrid.

**The content and scope of the book**: The book begins with the chapter defining the significance of the selection of materials processing technology and the selection of materials in engineering design and generally in manufacturing processes of products and their elements. Powder metallurgy has been especially distinguished among those technologies, defining it and presenting fundamental information concerning that technology. The following chapters of the book present information and results of own research, concerning the improvement of utility properties of sintered tool materials, such as high-speed steels, steel matrix composites reinforced by carbides, cemented carbides, cermets, ceramic and super hard materials as well as both gradient materials investigated within last few years and also made with selective laser sintering methods and new technologies of forming and powder sintering, among others: PIM method (Powder Injection Moulding) and MIM method (Metal Injection Moulding). The last part of the book includes instructions for the realisation of laboratory classes.

The scope of laboratory classes: In that part of the book instructions for laboratory classes realised in the framework of subjects: "Fundamentals of materials science", "Metal materials" and "Ceramic materials" and within specialist classes including several following subjects have been presented. The realisation of the aim of the classes presented in the instruction will enable students to familiarise themselves in details with powder technological properties, classic compaction and sintering technologies, modern methods of injection, non-pressure and extrusion moulding and a unique selective laser sintering methods. Mentioned new technologies and full laboratory equipment being at the disposal of the Institute of Engineering Materials and Biomaterials ensure the high level of realised classes, which will result with rich knowledge and high skills gained by students.

## Reference to this monograph should be given in the following way:

L.A. Dobrzański, G. Matula, Powder metallurgy fundamentals and sintered materials, Open Access Library, Volume 8 (14) (2012) 1-156 (in Polish).