Application of Powder Metallurgy in Production of Biomaterials

Pavel Novák, Kateřina Nová, Adriana Bernatiková, Andrea Školáková, Pavel Salvetr
University of Chemistry and Technology, Prague, Department of Metals and Corrosion Engineering, Technická 5, 166 28 Prague 6, Czech Republic, E-mail: panovak@vscht.cz

Metallic biomaterials are currently produced mainly by conventional metallurgical processes, i.e. the melting and casting used e.g. in production of cobalt alloy implants, or forming processes as cold or hot working (rolling or forging of stainless steel for surgical applications). Such processes including melting are used also in production of "smart" biomaterials – NiTi shape memory alloys. The mechanical properties are strongly dependent on the grain size. Therefore, the techniques to obtain finer structure are very desirable to enhance the mechanical properties of the biomaterials and thus to increase lifetime of the implant. This paper is devoted to the description of the possibilites of powder metallurgy not only for the structure refinement, but also for the ptoduction of clean biomedical alloys as well as the porous bioamterials. The use of powder metallurgy is described for Co-Cr-Mo surgical alloy, Ni-Ti shape memory alloy and Ti-based porous biomaterial. In addtion to known methods, new powder metallurgy processes and materials developed by the authors are presented.

Keywords: powder metallurgy, biomaterials, microstructure, properties

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