Microstructure and properties of magnets obtained by hydrostatic extrusion of Nd-Fe-B powders

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Nd-Fe-B MQ powder, provided by Magnequench, was initially densified in a copper capsule to reach about 60% of the theoretical density. Subsequently, three various processes of hydrostatic extrusion were conducted at room temperature. The values of true strain, obtained during the all three stages, were 1.38, 0.89, 0.94, respectively. The investigation performed showed, that the coercivity of the material decreases as the strain increases. Decrease of the remanence was observed only for the high strain. Size of the particles was strongly reduced during the extrusion processes. The X-ray diffraction showed no changes in the phase structure of the material. Mössbauer study of the sample extruded within all the three stages showed the existence of the $Nd_2Fe_{14}B$ phase and 16% of other phase. Analysis of magnetization versus temperature confirmed, that the additional phase was ferromagnetic.