



SOME CORROSION ELECTROCHEMICAL PROPERTIES OF THE ND-FE-B TYPE MAGNETIC MATERIAL

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Abstract

Research in the field of magnetic materials based on Nd-Fe-B is focused on the improvement of certain magnetic characteristics by alloying of suitable elements (Co, Dy, Tb, Ga), extending the thermal stability of these permanent magnets, improving their corrosion resistance and the creation of nano-structure modifications. Magnets based on Nd-Fe-B are susceptible to corrosion, especially in humid atmospheres. The corrosion resistance of these magnets is a function of the structure, temperature, degree of environment humidity and Nd-rich phase reactivity. The paper is focused on determining and comparing the corrosion resistance of selected material (Nd,Pr)2Fe14B (produced by powder metallurgy) in selected environments. For comparative purposes, unalloyed carbon steel (C \leq 0,10% wt., CSN 11321) was tested under the same test conditions. On the basis of electrochemical polarization measurements there were determined polarization curve, corrosion characteristics and parameters (corrosion potential, polarization resistance, pitting potentials, etc.) of mentioned selected materials in aqueous solutions (Na2SO4, NaH2PO4, NaCl). Salt spray test was performed on other samples of these materials. The heterogeneous structure of magnetic material and uneven and/or localized corrosion was observed using microscopy. In the sodium chloride solution a higher corrosion resistance reached steel in comparison with the magnet, in an environment of sodium sulfate results were not clear (depending on the pH, surface condition). The magnetic material exhibited a much higher resistance in the solution of NaH2PO4 in comparison with the corrosion resistance in other test solutions.

Keywords: Magnetic material, Nd-Fe-B, corrosion resistance, polarization test

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