# BARKHAUSEN NOISE IN NANOCRYSTALLINE Fe-Zr-B ALLOYS

**P. Plewka , J.J. Żebrowski and M. Urbanski**
Institute of Physics, Warsaw University of Technology
Koszykowa 75, 00-662 Warszawa, Poland

9.7 cm

Barkhausen noise is measured in Fe-Zr-B ribbons in which the morphology of primary crystallization changes from the dendritic growth, observed after low-temperature annealing, to the nucleation of spherical nanocrystals at higher annealing temperatures. The magnetic properties of the samples studied ranged from paramagnetic in the amorphous alloy to soft ferromagnetic in the nanocrystalline sample. The main magnetising process changed from rotations of the magnetisation vector in the dendritic grains to the displacements of domain walls in the nanocrystals leading to different patterns of Barkhausen noise. We found that the fraction of the crystalline phase in the samples analyzed affected the power spectra of the Barkhausen noise and had strong effect on the results of the calculation of the correlation dimension. The Barkhausen effect observed in the samples with a lower fraction of the crystalline phase seemed to be less dependent on the driving rate than in nanocrystalline alloys, where, at high driving rates, self-organization of the magnetization process leads to a strongly continous signal.

13.4 cm

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**Corresponding author :**
P. Plewka

**Address for correspondence :**
Institute of Physics
Warsaw University of Technology
Koszykowa 75, 00-662 Warszawa, Poland

**Email address :**
plewka@if.pw.edu.pl