

Accepted Manuscript

Characterization and modeling of magnetic domain wall dynamics using re-constituted hysteresis loops from Barkhausen noise

B. Ducharne, MQ. Le, G. Sebald, PJ. Cottinet, D. Guyomar, Y. Hebrard

PII: S0304-8853(16)30477-2

DOI: <http://dx.doi.org/10.1016/j.jmmm.2017.01.096>

Reference: MAGMA 62450

To appear in: *Journal of Magnetism and Magnetic Materials*

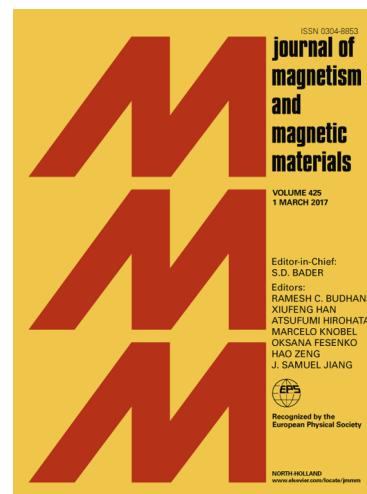
Received Date: 29 April 2016

Revised Date: 11 January 2017

Accepted Date: 29 January 2017

Please cite this article as: B. Ducharne, MQ. Le, G. Sebald, PJ. Cottinet, D. Guyomar, Y. Hebrard, Characterization and modeling of magnetic domain wall dynamics using reconstituted hysteresis loops from Barkhausen noise, *Journal of Magnetism and Magnetic Materials* (2017), doi: <http://dx.doi.org/10.1016/j.jmmm.2017.01.096>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.



Characterization and modeling of magnetic domain wall dynamics using reconstituted hysteresis loops from Barkhausen noise.

B. Ducharne, MQ. Le, G. Sebald, PJ. Cottinet, D. Guyomar, Y. Hebrard*

Laboratoire de Génie Electrique et Ferroélectricité – INSA de Lyon
Bât. Gustave FERRIE, 8 rue de la physique, 69621 Villeurbanne cedex, France

*SKF-Aerospace,
22 rue Brillat SAVARIN, 26958 VALENCE, France

Corresponding author: Ducharne B.
Benjamin.ducharne@insa-lyon.fr
Tél: +33 (0)4 72 43 88 33 Fax: +33 (0)4 72 43 88 74

ABSTRACT

By means of a post-processing technique, we succeeded in plotting magnetic Barkhausen noise energy hysteresis cycles $MBN_{energy}(H)$. These cycles were compared to the usual hysteresis cycles, displaying the evolution of the magnetic induction field B versus the magnetic excitation H . The divergence between these comparisons as the excitation frequency was increased gave rise to the conclusion that there was a difference in the dynamics of the induction field and of the MBN_{energy} related to the domain wall movements. Indeed, for the MBN_{energy} hysteresis cycle, merely the domain wall movements were involved. On the other hand, for the usual $B(H)$ cycle, two dynamic contributions were observed: domain wall movements and diffusion of the magnetic field excitation. From a simulation point of view, it was demonstrated that over a large frequency bandwidth a correct dynamic behavior of the domain wall movement $MBN_{energy}(H)$ cycle could be taken into account using first-order derivation whereas fractional orders were required for the $B(H)$ cycles. The present article also gives a detailed description of how to use the developed

Download English Version:

<https://daneshyari.com/en/article/5491023>

Download Persian Version:

<https://daneshyari.com/article/5491023>

[Daneshyari.com](https://daneshyari.com)