

# Enhanced Perpendicular Exchange Bias in Co/Pd Antidot Arrays

T. N. Anh Nguyen (Foreign) <sup>1</sup>,

J. Fedotova (Foreign) <sup>2</sup>,

J. Kasiuk (Foreign) <sup>3</sup>,

W.-B. Wu (Foreign) <sup>4</sup>,

J. Przewoznik (Foreign) <sup>5</sup>,

C. Kapusta (Foreign) <sup>6</sup>,

O. Kupreeva <sup>7</sup>,

S. Lazarouk <sup>8</sup>,

T. H. Thuy Trinh (Foreign) <sup>9</sup>,

K. Tung Do (Foreign) <sup>10</sup>,

H. Manh Do (Foreign) <sup>11</sup>,

D. Lam Vu (Foreign) <sup>12</sup>,

J. Akerman (Foreign) <sup>13</sup>

1 Foreign (Institute of Materials Science, Vietnam Academy of Science and Technology, Hanoi, Vietnam; Material Physics Department, Royal Institute of Technology, 164 40, Kista, Sweden; Department of Physics, University of Gothenburg, 41296, Gothenburg, Sweden)

2 Foreign (Institute for Nuclear Problems, Belarusian State University, 220030, Minsk, Belarus; Faculty of Physics and Applied Computer Science, AGH University of Science and Technology, 30-059, Krakow, Poland)

3, 4 Foreign (Institute for Nuclear Problems, Belarusian State University, 220030, Minsk, Belarus)

5, 6 Foreign (Faculty of Physics and Applied Computer Science, AGH University of Science and Technology, 30-059, Krakow, Poland)

7, 8 R&D Department, R&D Lab 4.12 «Electrochemical nano-structure materials», Department of Micro- and Nanoelectronics, Belarusian State University of Informatics and Radioelectronics, Minsk, Belarus

9, 10, 11, 12 Foreign (Institute of Materials Science, Vietnam Academy of Science and Technology, Hanoi, Vietnam)

13 Foreign (Material Physics Department, Royal Institute of Technology, 164 40, Kista, Sweden; Department of Physics, University of Gothenburg, 41296, Gothenburg, Sweden)

**Keywords:** Multilayered Co/Pd thin films, Porous TiO<sub>2</sub> templates, Perpendicular magnetic anisotropy, Exchange bias.

**Abstract:** Magnetic nanostructures revealing the exchange bias (EB) effect have attracted much interest in recent years due to their promising applications in spintronics, magnetic sensing and recording devices with various functionalities. In this paper, we report on the perpendicular exchange bias effect in a multilayered thin film composed of [Co/Pd] ferromagnetic multilayers exchange-coupled to an antiferromagnetic IrMn. The film was deposited on a porous anodized titania template. Influences of the films' surface morphology as well as the order of layers deposited on the EB effect were studied. The enhancements of the EB field  $H_{EB}$  (up to 30%) and the coercive field  $H_c$  (two times) were achieved in the nanoporous films relative to their continuous film counterparts, which could be attributed to the specific morphology of the porous surfaces.

**This article published in:** Enhanced Perpendicular Exchange Bias in Co/Pd Antidot Arrays / T. N. Anh Nguyen [and others] // Journal of Electronic Materials – 2019. – Vol. 48 (3) – P. 1492-1497. – <https://doi.org/10.1007/s11664-018-06847-3>.

**Internet link to the article:**

<https://link.springer.com/article/10.1007%2Fs11664-018-06847-3>.

© 2019 Springer Nature Switzerland AG. Part of Springer Nature.