VIETNAM NATIONAL UNIVERSITY, HANOI
VNU UNIVERSITY OF ENGINEERING AND TECHNOLOGY

SOCIALIST REPUBLIC OF VIETNAM
Independence – Freedom – Happiness

INFORMATION ON DOCTORAL THESIS

1. Full name: **Vu Nguyen Thuc**..... 2. Sex: Male

3. Date of birth: 06/06/1980 ..... 4. Place of birth: Yen Bai province

5. Admission decision number: 640/QĐ-CTSV Dated: 03/9/2015

6. Changes in academic process: None

7. Official thesis title: .....

8. Major: Nano material and nanodevice..... 9. Code: 944012801.QTD .....

10. Supervisors: 1. Assoc.Prof. Do Thi Huong Giang.....

2. Prof.Dr. Nguyen Huu Duc

11. Summary of the **new findings** of the thesis: .....

The thesis is deeply scientific research, which has been conducted completely and systematically in terms of results and achievements in characterizing the tunable magnetic states in multiferroic systems through SMME coupling effect, in both global and domestic views. The new findings of the thesis can be briefly listed as follows:

- Proposed a novel technique to fabricate micro-patterned thin film and ribbon forms by using laser and wet chemical etchings. The fabricated micro-patterned systems have the lowest dimension of 60 μm in width, with high quality, and reproducibility without losing the initial magnetic properties of input magnetic materials.

- Characterized the magnetic properties of different micro-patterned configurations in terms of shapes, branch-widths to optimize experimentally and simulationally the geometric configurations. The optimal structure is in honeycomb configuration with branch-width of 60 μm with advantageous magnetic properties.

- Characterized and selected the optimal sputtering parameters dedicated to soft magnetic thin films. Magnetically investigated the properties of triangle/square/hecxagonal-patterned structure of deposited NiFE films with unit cell about 200 μm and thickness of NiFe approximately 45 nm.

- Investigated tailoring the magnetic states in multiferroic systems through SMME coupling effect in a wide range of applied electric fields from -20 kV/cm to 20 kV/cm, and under various applied magnetic field (1, 10, 50 Oe). The results suggest that the

tunable magnetic states under various external parameters are clear and possible to apply towards other physical systems.

Some of the new findings in this thesis have been published in four peer-reviewed journal/proceeding/patent, i. e., 01 in ISI ranked journal - Journal of Alloys and Compounds (IF 6.3), 02 in proceeding of SPMS2021, and 01 patent (accepted proposal).

12. Practical applicability, if any: .....

13. Further research directions, if any: .....

14. Thesis-related publications:

+ Vu Nguyen Thuc, Ho Anh Tam, Do Thi Huong Giang, Nguyen Huu Duc, Nguyen Thi Ngoc, Vu Thi Ngoc Khanh, Le Van Lich, Van-Hai Dinh (2021), "Hierarchical geometric designs for Fe-based amorphous materials with tunable soft magnetic properties", Journal of Alloys and Compunds 895 (2021), 162628.

+ Vu Nguyen Thuc, Vu Thi Ngoc Khanh, Ho Anh Tam, Nguyen Huu Duc, Nguyen Thi Ngoc, Do Thi Huong Giang, “Non-cleanroom Microstructure Fabrication Method”, (Application number: 1-2021-01146. Acceptance of Application no 5345w/QĐ-SHTT date issued: 31/03/2021).

+ Vu Nguyen Thuc, Ho Anh Tam, Nguyen Thi Ngoc, Vu Thi Thao, Nguyen Huu Duc, Vu Thi Ngoc Khanh, Do Thi Huong Giang (2022), “Research and fabrication of artificial microcellular structures using laser etching and wet etching techniques”, Proceeding of National Conferences on Solid state Physics and Material Science - SPMS 2021, page 78.

+ Vu Nguyen Thuc, Ho Anh Tam, Le Van Lich, Dinh Van Hai, Nguyen Van Tuan, Nguyen Thi Ngoc, Nguyen Huu Duc, Do Thi Huong Giang (2022), “Study and control of electromagnetic properties in low magnetic field of composite ferromagnetic materials based on amorphous FeCSi ribbon for artificial microcellular structure”, Proceeding of National Conferences on Solid state Physics and Material Science - SPMS 2021, page 83.