

Final Report of the work done on the Minor Research Project

1. Project report No. : 2 (Final)
2. UGC Reference No. : 47-1351/10(WRO)
3. Period of report: from October 2010 to October 2012
4. Title of research project: **Synthesis of MnZn ferrites and the study of effect of ball milling on their structural, thermal and magnetic properties**
5. (a) Name of the Principal Investigator: **Dr. Sunita Bhagwat**
(b) Department and College where work has progressed:
Department of Physics, Abasaheb Garware College, Karve Road, Pune – 411 004
6. Effective date of starting of the project: 22/10/2012
7. Grant approved and expenditure incurred during the period of the report:
 - a. Total amount approved Rs. 1,60,000
 - b. Total expenditure Rs: 1,60.035

Report of the work done:

(i) Brief objective of the project:

- Synthesis of Mn, Zn and MnZn Ferrites
- To observe effect of ball milling on the magnetic properties of these ferrites
- To study the structural properties with grain size effect using XRD and SEM techniques.
- IR and UV : Could not get the appropriate results
- TGA: Could not performed due to lack of the funds

(ii) Work done so far and results achieved and publications, if any, resulting from the work

List of Publications

- 1. Structural and magnetic properties of nano-sized Zn substituted MnFe₂O₄ particles**
Pratibha Rao, Sheetal Chalke and **Sunita Bhagwat**
International Journal of Applied Physics 2(3) (2012) 147-157.
- 2. Effect of vanadium ion doping on the structural and dielectric properties of Nickel-Zinc ferrite**
Pratibha Rao, Anupama Bhattacharya and **Sunita Bhagwat**
International Journal of Physics and Applications 4(2) (2012) 129-138.
- 3. Study of Dielectric Properties of Nano-crystalline Mn-Zn Ferrite**
Sunita Bhagwat and Pratibha Rao
IOSR Journal of Applied Physics 3(1) (2013) 1-6.
- 4. Deposition and characterization of magnetic zinc ferrite thin films using spray pyrolysis**
Pratibha Rao, Sonali Shende and **Sunita Bhagwat**
Proceedings of AMPC 2013, 1 (2013) 510-518.

(iii) Has the progress been according to original plan of work and towards achieving the objective, if not, state reasons: YES

- (iv) **Please indicate the difficulties, if any, experienced in implementing the project:**
As PI explained in earlier report that the grant for contingency is insufficient. XRD, VSM, SEM etc. are paid services at Department of Physics, University of Pune, Pune. The expenditure of these services was barred by the Investigator.
- (v) If the project has been completed, please enclose a summary of the findings of the study: Separate bound copy attached
- (vi) **Any other information which would help in evaluation of work done on the project. At the completion of the project, the first report should indicate the output, such as (a) Manpower trained (b) Ph. D. awarded (c) Publication of results (d) other impact, if any:** Due to this minor research project, PI can able to work in different areas like thin films, dielectric measurements which was not the part of the minor research project. The project is very much beneficial for the PI in terms of academic improvement. One Ph.D. student is registered under PI. PI and her students received a platform to present their research work.

Papers presented / will be presenting in International Conferences

1. **1st International Symposium on Physics and Technolgy of Sensors (ISPTS)** organised by Centre for Materials for Electronics Technology (C-MET), Pune which was held on March 8-10, 2012 and presented a Poster
2. **International Conference and Workshop on Nanostructured Ceramics and other Nanomaterials (ICWNCN)** by Department of Physics, University of Delhi, Delhi which was held on March 14-116, 2012 and presented a Poster
3. **Deposition and characterization of magnetic zinc ferrite thin films using spray pyrolysis** Pratibha Rao, Sonali Shende and **Sunita Bhagwat**
Paper is accepted for Oral presentation at **Second International Conference on Advances in Materials Processing and Characterization (AMPC2013)**, by College of Engineering Guindy, Anna University, Chennai, India which will be held during 6th -8th February 2013.

Papers presented by post graduate students who worked under PI as a project student:

The following posters were presented at 17th **Raman Memorial Conference**, organized by Department of Physics, University of Pune on March 2-3, 2012 and it is published in Proceedings of Raman Memorial Conference:

1. Effect of Vanadium Ion Doping on the Dielectric Properties of Nickel-Zinc Ferrite

Anupama Bhattacharya, Pratibha Rao and **Sunita Bhagwat**

2. Conductivity Study of pH Controlled Nano-sized Ni-Ferrite on the Possibility of Use as a Gas Sensor

Vaishali Takale, Pratibha Rao and **Sunita Bhagwat**

3. Physical Properties of Spray Deposited CdS Thin Films

Amruta Jadhav and **Sunita Bhagwat**

4. Synthesis and Characterization of ZnO Thin Films using Designed and Fabricated Spin Coater

V. Dushing, P. Waifalkar and **Sunita Bhagwat**

5. Synthesis of Nanostructured ZnFe₂O₄ Thin Films by Spray Pyrolysis for Photo Electro-chemical Water Splitting

Sonali Shende, Pratibha Rao and **Sunita Bhagwat**

Presented a poster at State level conference on **Recent Trends in Materials Science** organised by Department of Physics, C.T. Bora College, Shirur on January 20-21, 2012.

SIGNATURE OF THE PRINCIPAL INVESTIGATOR: Dr. Sunita Bhagwat

PRINCIPAL: Dr. S. G. Gupta