2018-19
(5 Year)

Abhijeet Sabhasad & Co.
Chartered Accountants

2710, A Ward, Gurudeo Apartment
Near Kothishala, Kolhapur 416012
Phone: 0231- 2621242
Email: a.sabhasad@gmail.com

ICAI UDIN: 19119759AAAAAA6842

UGC-DAE Consortium for Scientific Research
BARC Mumbai

UTILIZATION CERTIFICATE

Certified that the grant of Rs. 2,60,600/- (Rs. Two Lakh Sixty Thousand Six Hundred Only) received from UGC-DAE Consortium for Scientific Research for Collaborative Research Scheme titled "Synthesis and Characterization of rare earth doped cobalt nano-ferrites for their applications in electronic and biomedical devices" (CRS-M-203) - as per letter no. UDCSR/MUM/CD/CRS-M-203/2018/038 dated 18th April 2018 AND UDCSR/MUM/CD/CRS-M-203/2018/117 dated 4th June 2018. Totaling of Rs. 2,60,600/- (Rs. Two Lakh Sixty Thousand Six Hundred Only). Rs. 2, 60,673/- (Rs. Two Lakh Sixty Thousand Six Hundred Seventy-Three Only) has been utilized for the purpose for which it was sanctioned with the terms and conditions laid down by the UGC-DAE Consortium for Scientific Research.

For Abhijeet Sabhasad & Co
Firm Regn No. 128553W
Chartered Accountants

Principal Investigator

Principal

Principal
Rajaram College, Kolhapur

Abhijeet Sabhasad
Proprietor
M. No. 119759

Date: 11th April 2019
Place: Kolhapur

ISMAIL YUSUF COLLEGE
MUMBAI

2019

Abhijeet Sabhasad & Co.
Chartered Accountants

2710, A Ward, Gurudeo Apartment
Near Kothishala, Kolhapur 416012
Phone: 0231- 2621242
Email: a.sabhasad@gmail.com

ICAI UDIN: 19119759AAAAAI2624

UGC-DAE Consortium for Scientific Research
BARC Mumbai

UTILIZATION CERTIFICATE

Certified that the grant of Rs. 1,06,560/- (Rs. One Lakh Six Thousand Five Hundred Sixty Only) received from UGC-DAE Consortium for Scientific Research for Collaborative Research Scheme titled "Synthesis and Characterization of rare earth doped cobalt nano-ferrites for their applications in electronic and biomedical devices" (CRS-M-203) - as per email reference dated 23rd April 2019 Ch No 784990. Rs. 1,06,560/- (Rs. One Lakh Six Thousand Five Hundred Sixty Only) has been utilized for the purpose for which it was sanctioned with the terms and conditions laid down by the UGC-DAE Consortium for Scientific Research.

Principal Investigator

Principal
PRINCIPAL,
Rajaram College, Kolhapur

For Abhijeet Sabhasad & Co
Firm Regn No. 128553W
Chartered Accountants

Abhijeet Sabhasad
Proprietor
M. No. 119759

Abhijeet Sabhasad • M. No. 119759 • Chartered Accountants

Date: 10th October 2019
Place: Kolhapur

ISMAIL YUSUF COLLEGE
MUMBAI

2015-2019

Abhijeet Sabhasad & Co.
Chartered Accountants

2710, A Ward, Gurudeo Apartment
Near Kothishala, Kolhapur 416012
Phone: 0231- 2621242
Email: a.sabhasad@gmail.com

ICAI UDIN: 19119759AAAAAJ9141

UGC-DAE Consortium for Scientific Research
BARC Mumbai

UTILIZATION CERTIFICATE

Certified that total grant of Rs. 10,52,013/- (Rs. Ten Lakh Fifty-Two Thousand Thirteen Only) received from UGC-DAE Consortium for Scientific Research for Collaborative Research Scheme titled "Synthesis and Characterization of rare earth doped cobalt nano-ferrites for their applications in electronic and biomedical devices" (CRS-M-203) for the period 2015-2019. Rs. 10,58,251/- (Rs. Ten Lakh Fifty-Eight Thousand Two Hundred Fifty-One Only) has been utilized for the purpose for which it was sanctioned with the terms and conditions laid down by the UGC-DAE Consortium for Scientific Research. The details are as follows:

Year	Amount Sanctioned	Amount Utilized	UC Date
2015	2,00,833.00	2,02,985.00	17-Feb-2016
2016	2,46,600.00	2,37,420.00	15-Mar-2017
2017	2,37,420.00	2,50,613.00	31-Mar-2018
2018	2,60,600.00	2,60,673.00	11-Apr-2019
2019	1,06,560.00	1,06,560.00	10-Oct-2019
	10,52,013.00	10,58,251.00	

Principal Investigator

Principal
PRINCIPAL,
Rajaram College, Kolhapur

For Abhijeet Sabhasad & Co
Firm Regn No. 128553W
Chartered Accountants

Abhijeet Sabhasad
Proprietor
M. No. 119759

Abhijeet Sabhasad • M. No. 119759 • Chartered Accountants

Date: 10th October 2019
Place: Kolhapur

ISMAIL YUSUF COLLEGE
MUMBAI

18-19

विश्वविद्यालय अनुदान आयोग - परमाणु ऊर्जा विभाग वैज्ञानिक अनुसंधान संकुल
UGC-DAE Consortium For Scientific Research
(विश्वविद्यालय अनुदान आयोग - नई दिल्ली द्वारा स्थापित स्वशासी संस्थान)
(An autonomous Institution of UGC, New Delhi)

मुंबई केन्द्र
Mumbai Centre

RAJARAM COLLEGE OFFICE
Date 07.06.18
No. 1311

डॉ. वासुदेवा सिरुगूरी
Dr. Vasudeva Siruguri
केंद्र निदेशक / Centre Director

Date : 04th June, 2018

Ref : UDCSR/MUM/CD/CRS-M-203/2018/117

To,
Principal,
Rajaram College, Vidyanagar, Kolhapur – 416004

Sub: Release of funds for the year 2018 against Collaborative research Scheme titled ***"Synthesis and characterization of rare earth doped cobalt nano-ferrites for their applications in electronic and biomedical devices"*** *(CRS-M-203).*

Dear Sir,

It is to inform that we have transferred an amount of Rs.14,000/- (Rupees Fourteen Thousand Only) through RTGS / NEFT on 01.06.2018 by our SBI Cheque no. 262709 dated 31.05.2018 towards Enhancement of Fellowship of Miss. Deepali M Ghone, Project Fellow under the Collaborative Research Scheme titled as above w.e.f. 01.06.2018.

The amount released under the different heads is shown below :

Sr. No.	Particulars	Amount
1.	Revised and admissible Fellowship from 01.06.2018 to 31.12.2018 @ 16000/- (16000*7)	1,12,000.00
2.	HRA	(*)
3.	**Total Fellowship due along without HRA**	**1,12,000.00**
4.	Amount already released towards fellowship for the period 01.06.2018 to 31.12.2018 vide our letter no. UDCSR/MUM/CD/CRS-M-203/2018/038 dated 18.04.2018.	98,000.00
5.	**Total Amount Released (2 – 3)**	**14,000.00**

***Rates for HRA are under revision and the amount for the same will be transferred as soon as the rates are regularized.**

Note: The Head wise expenditure in any case should not exceed from the amount released under the head.

Kindly acknowledge the receipt of the amount transferred by sending stamped receipt.

Thanking You,

Yours sincerely,

Centre – Director

Copy to : Dr. Ketaki K. Patankar, Assistant Professor, Physics Department, Rajaram College Vidyanagar, Kolhapur – 416004, Maharashtra.

२४६-सी, दूसरी मंज़िल, सामान्य सुविधा भवन, भाभा परमाणु अनुसंधान केन्द्र, ट्रॉम्बे, मुंबई - ४०० ०८५
246-C, 2nd Floor, Common Facility Building, Bhabha Atomic Research Centre, Trombay, Mumbai 400 085.
Phone : +91 022 25594930, 25505157, 25505327 • Fax : +91 022 25505151

19-20

मुंबई केन्द्र
Mumbai Centre

विश्वविद्यालय अनुदान आयोग - परमाणु ऊर्जा विभाग वैज्ञानिक अनुसंधान संकुल
UGC-DAE Consortium For Scientific Research

(विश्वविद्यालय अनुदान आयोग - नई दिल्ली द्वारा स्थापित स्वशासी संस्थान)

(An autonomous institution of UGC, New Delhi)

Ref: UDCSR/MUM/CD/CRS-M-203/2019/546

Date : 21st February, 2019

To,
Dr. Ketaki K. Patankar
Assistant Professor
Physics Department
Rajaram College
Vidyanagar, Kolhapur – 416004, Maharashtra.

Sub: Extension of Collaborative research Scheme titled "*Synthesis and characterization of rare earth doped cobalt nano-ferrites for their applications in electronic and biomedical devices*".(CRS-M-203)

Dear Dr. Patankar,

We are happy to inform you that your above Collaborative Research Scheme (CRS) has been extended for the period of 06 months with effect from 1st January 2019 to 30th June 2019 with the following financial sanction.

Sl. No.	Head	Amount sanctioned for current year (01.01.2019 to 30.06.2019 (*)
1.	Scholarship / Fellowship(#)	(**)
Note:	No overheads are available under this scheme	

(*)Funds will be transferred only after receiving grants from University Grants Commission, New Delhi.

(**) Grants under scholarship will be transferred after appointment of student as per the guidelines of UGC-DAE CSR. If the student has already been appointed in your project and is continuing in the project, PI may please provide the appointment extension letter for release of Scholarship / Fellowship.

(#) Point no. 2.4 of guidelines is to be invariably mentioned in the appointment letter issued to student.

Guidelines regarding implementation of the CRS, Review, Appointment of Project fellow, Travel support to the PI or Student to visit BARC for performing experiments, etc. are enclosed herewith.

Dr.S.D.Kaushik,UGC-DAE CSR, Mumbai Centre,(Email: sdkaushik@csr.res.in), will continue to be your Principal Collaborator (PC) for the above scheme.

Please send us your acceptance letter by 08th March, 2019. On receipt of your (i) acceptance letter and (ii) **fund utilization statement for the period 01.01.2018 to 31.12.2018**, financial grant for CRS will be sent through NEFT/ RTGS (kindly provide details in the enclosed format along with the acceptance letter) to the **Registrar/Financial Authority** of your Institute subject to receipt of funds from UGC, New Delhi.

Thanking you,

Yours sincerely,

Section Officer

Encl: As stated

Copy to,
1. Principal, Rajaram College, Vidyanagar, Kolhapur – 416004
2. Head, Solid State Physics Division, BARC, Trombay, Mumbai - 400085
3. Director, UGC-DAE CSR, Univ.Campus, Khandwa Road, Indore – 452001.
4. Dr.S.D.Kaushik, UGC-DAE CSR, Mumbai Centre, CFB, BARC, Trombay, Mumbai – 400085.

ISMAIL YUSUF COLLEGE ★ MUMBAI ★

२४६-सी, दूसरी मंज़िल, सामान्य सुविधा भवन, भाभा परमाणु अनुसंधान केन्द्र, ट्रॉम्बे, मुंबई - ४०० ०८५
246-C, 2nd Floor, Common Facility Building, Bhabha Atomic Research Centre, Trombay, Mumbai-400 085.
Phone : +91 22 25505327, 25594727 • Fax : +91 22 25505402
E-mail : udcsr.mum@csr.res.in

Completion
15-19

मुंबई केन्द्र
Mumbai Centre

विश्वविद्यालय अनुदान आयोग - परमाणु ऊर्जा विभाग वैज्ञानिक अनुसंधान संकुल
UGC-DAE Consortium For Scientific Research
(विश्वविद्यालय अनुदान आयोग - नई दिल्ली द्वारा स्थापित स्वशासी संस्थान)
(An autonomous institution of UGC, New Delhi)

Ref: UDCSR/MUM/AO/CRS-M-203/2020/665

Date: 31st January, 2020

To,
Dr.Ketaki K.Patankar
Assistant Professor
Physics Department
Rajaram College
Vidyanagar, Kolhapur-416004, Maharashtra.

Sub: Completion of Collaborative Research Scheme titled "**Synthesis and characterization of rare earth doped cobalt nano-ferrites for their applications in electronic and biomedical devices.**"(CRS-M-203)

Dear Dr.Patankar,

We would like to inform that, the above said Subject Project (CRS-M-203) is successfully completed on 30.06.2019.

This is for your information please.

Thanking You,

Yours Sincerely,

Administrative Officer-I

पवन कुमार / PAWAN KUMAR
प्रशासनिक अधिकारी-I / Administrative Officer-I
यू.जी.सी.-डी.ए.ई. परामर्श केन्द्र / UGC-DAE CSR, Mumbai Centre
सी.एफ.बी. 2री मंजिल, यू.जी.सी.-डी.ए.ई. 2nd Floor C.F.B.
बी.ए.आर.सी. ट्रामबे / B.A.R.C. Trombay,
मुम्बई-४०००८५ / Mumbai - 400 085

Copy to:
1. Principal, Rajaram College, Vidyanagar, Kolhapur-416004.
2. Dr.S.D.Kaushik, UGC-DAE CSR, Mumbai Centre, CFB, BARC,

ISMAIL YUSUF COLLEGE
MUMBAI

2 Collaborative Research using DAE and CSR facilities

2.1 Collaborative Research at Dhruva Reactor, BARC

2.1.1 Magnetoelectric measurements of previously synthesized Ho substituted cobalt ferrite and PSLZT composite with the function of magnetic field and frequency.

The Magnetoelectric (ME) effect is a combined effect of magnetostrictive effect in the magnetic phase and piezoelectric effect in the piezoelectric phase. The ME bilayer composites were made by sticking Ho doped cobalt ferrite ($CoFe_{2-x}Ho_xO_4$ x=0.0, 0.01, 0.02, 0.03, 0.05 and 0.15 prepared by sol-gel method acts as a magnetostrictive phase) and PSLZT (piezoelectric phase) by epoxy glue. G Srinivasan et. al. have proposed a theoretical model to investigates ME coefficient in layered ME composites. The ME measurement were carried out with the function of DC magnetic field in the range of 0-3900 Oe by keeping frequency constant at 1 kHz. The magnetoelectric voltages generated in the presence of ac and dc magnetic field were measured by lock in amplifier (Stanford Research Systems Model SR830 DSP) in transverse direction. The comparison of theoretical (for different coupling coefficient i.e. k=0.01, 0.02, 0.03, 0.04 and 0.05) and experimental curve for magnetoelectric coefficient for all concentration of Ho substituted cobalt ferrite made by sol-gel auto combustion method is shown in figure 1. Among all concentration of Ho substituted cobalt ferrite x=0.02 shows highest value ME coefficient i.e. upto 11 mV/cm Oe which is slightly larger than theoretical value for k=0.5 but all other samples shows quite smaller value than theoretical values. Though Ho substituted cobalt ferrite shows higher magnetostriction, magnetoelectric coefficient shows lower value it is because of this ferrite have lower permeability and higher magnetocrystalline anisotropy.

ME effect of Ho substituted cobalt ferrite with the function of frequency were carried out for transverse direction which is shown in figure 2 for Ho substituted cobalt ferrite (x=0.0, 0.01, 0.02, 0.03, 0.05 and 0.15). Sample with composition x=0.02 and 0.03 shows highest value of magnetoelectric coefficienti.e x=0.02 shows 26.66 mV/cm Oe at 80 kHz and 0.03 also shows 26.66 mV/cm Oe at 85 kHz. Magnetoelectric materials/composites have applications in the area of sensors, transducers, microwave devices and heterogeneous read/write devices.

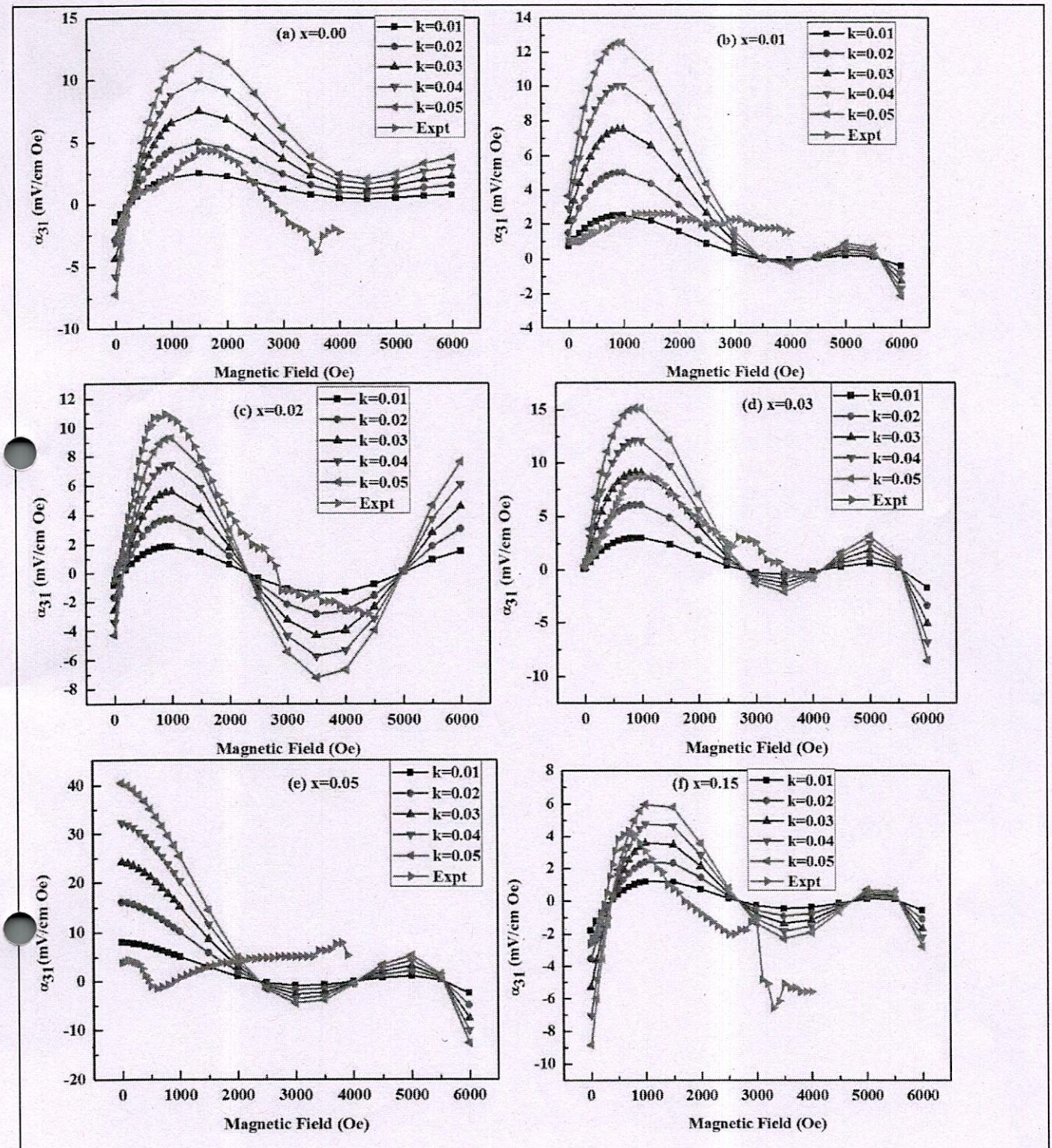

Fig1. Comparision of theoretical and experimental ME effect of $CoFe_{2-x}Ho_xO_4$ ferrite (x=0.0, 0.01, 0.02 , 0.03, 0.05 and 0.15).

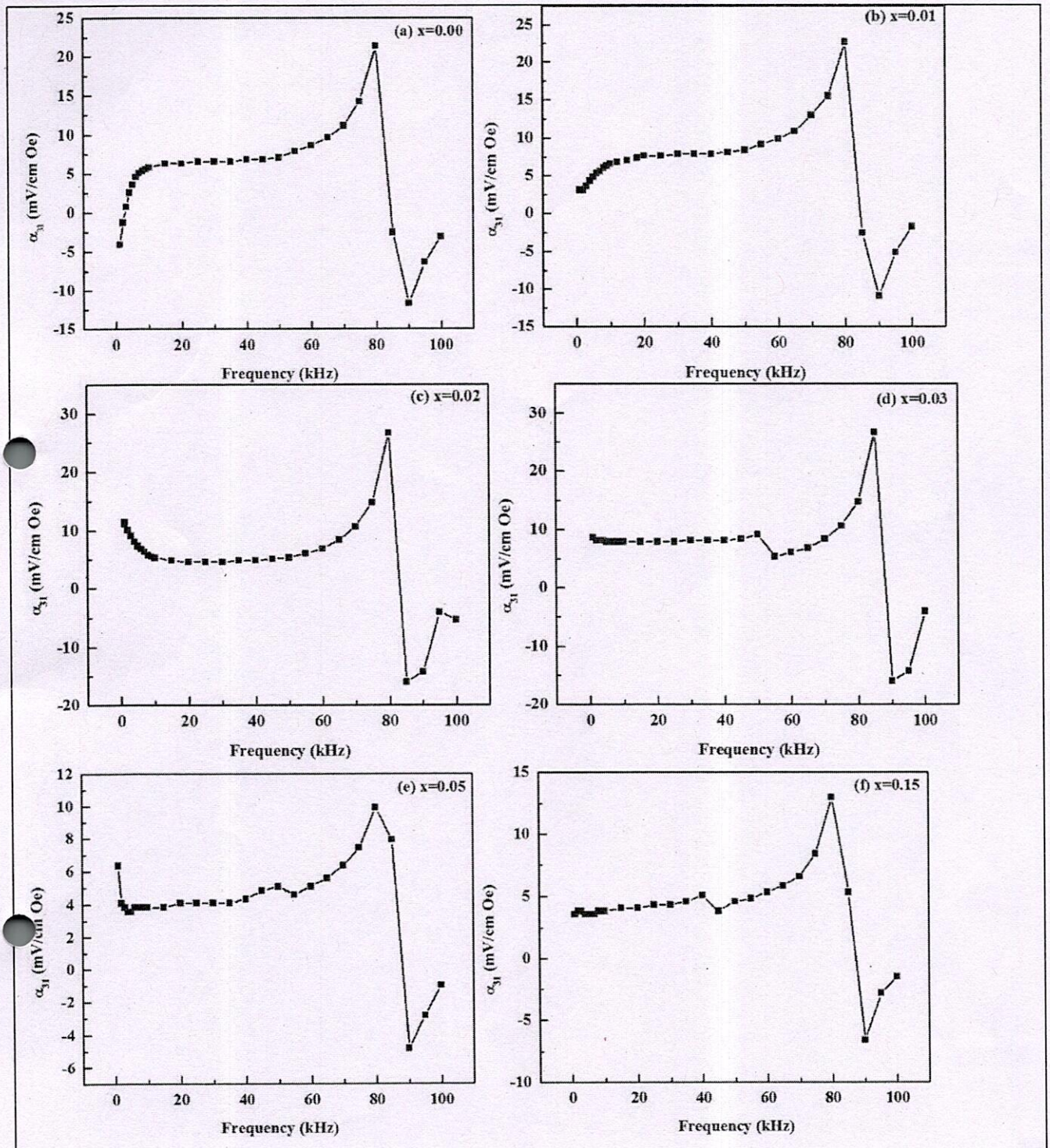

Fig2. ME effect of $CoFe_{2-x}Ho_xO_4$ ferrite (x=0.0, 0.01, 0.02, 0.03, 0.05 and 0.15) with respect to frequency.

Deepali Ghone[1,2], K K Patankar[1], V L Mathe[2], S D Kaushik[3]
[12]Department of Physics,Rajaram College, Kolhapur,416004.
[2]Department of Physics, SPPU, Pune,411007.
[3]UGC-DAE CSR, Mumbai,400085.

4. PUBLICATIONS IN JOURNALS

4.1. Publications Arising from Collaborative Research Scheme and use of UGC - DAE CSRFacilities by University Scientists

1.Microstructure, lattice strain, magnetic and magnetostriction properties of holmium substituted cobalt ferrite obtained by co-precipitation method.
Deepali M. Ghone*, V.L. Mathe*, K.K. Patankar*, S.D. Kaushik#, Journal of Alloys and Compounds 739(2018) 52-61.

2. Structural and physical property study of sol–gel synthesized CoFe2-xHoxO4 nano ferrites.
K.K. Patankar*, D.M. Ghone*, V.L. Mathe*, S.D. Kaushik#, Journal of Magnetism and Magnetic Materials 454 (2018) 71–77.

3. Influence of substitution of yttrium in cobalt ferrite on the structural, magnetic and Magnetostrictive properties.
D M Ghone*, V L Mathe*, K. K. Patankar*, S. D. Kaushik#, AIP Conference Proceedings, 1942, 130026 (2018)

4. Synthesis and characterization of $CoFe_{2-x}Y_xO_4$ (x=0.05-0.2) by Auto Combustion Method.
K.K. Patankar*, P.S. Jadhav*, Jyoti Devkar*,D. M. Ghone*, S.D. Kaushik#, AIP Conference Proceedings, 1832, 050172 (2017).

5. Magnetic and Magnetostrictive Properties of Sol-gel prepared Y substituted Cobalt Ferrite.
Deepali M. Ghone*, V L Mathe*, K K Patankar*, S D Kaushik# (Submitted manuscript to AIP Conference Proceedings (2019)).
Title of the paper

5. PRESENTATIONS IN CONFERENCES / SYMPOSIA

1. "Magnetization studies in holmium doped Co-ferrite".

   Deepali M. Ghone*, V.L. Mathe*, K.K. Patankar*, S.D. Kaushik#

   Research Scholar's Workshop on Material Science with Neutrons, 2016 , UGC-DAE CSR, Mumbai Centre, R-5 Shed, BARC Campus, Trombay, Mumbai, Maharashtra. (Poster and Oral presentation) (3-4 February 2016)
2. Raman Memorial Conference 2016, Department of Physics, Savitribai Phule Pune University, Pune, Maharashtra.(12-13 February 2016).
3. "Structural and Magnetic properties of $CoFe_{2-x}Ho_xO_4$ synthesized by sol-gel combustion routes".

   Deepali M. Ghone*, V.L. Mathe*, K.K. Patankar*, S.D. Kaushik#

Silver Jubilee conference on Study of Matter Using Intense Radiation Sources and under Extreme Conditions, UGC- DAE, CSR, Indore, Madhyapradesh. (Poster presentation).(3-6 November 2016).

4. "Structural and magnetic study of Y doped Co ferrite by co-precipitation method".

   Deepali M. Ghone*, V.L. Mathe*, K.K. Patankar*, S.D. Kaushik#

   Raman Memorial Conference 2017, Department of Physics, Savitribai Phule Pune University, Pune, Maharashtra. (Poster presentation). (3-4 March 2017).

5. "Effect of Ho substituting on the magnetoelectric properties of composite of $CoFe_2O_4$ and PSLZT".

   Deepali M. Ghone*, V.L. Mathe*, K.K. Patankar*, S Premkumar*, S.D. Kaushik#

   Raman Memorial Conference 2018, Department of Physics, Savitribai Phule Pune University, Pune, Maharashtra. (Poster presentation) (23-24 February 2018).

6. "Structural and Magnetic Properties of Yttrium doped cobalt ferrite synthesized by sol-gel auto combustion method".

   Deepali M. Ghone*, V.L. Mathe*, K.K. Patankar*, S.D. Kaushik#

   International Conference on Nanotechnology for Human Welfare 2018 (ICNHW 2018), H V Desai College, Pune, Maharashtra. (Poster presentation). (1-3 February 2018).

7. "Magnetic and Magnetostrictive properties of sol-gel prepared Y substituted cobalt ferrite".

   Deepali M. Ghone*, V.L. Mathe*, K.K. Patankar*, S.D. Kaushik#

   63rd DAE Solid State Physics Symposium (Dec 2018), Guru Jambheshwar University of Science and Technology, Hisar, Haryana. (Poster presentation) (18-22 December 2018).

8. 25th Raman Memorial Conference -2019, Department of Physics, Savitribai Phule Pune University, Pune, Maharashtra.(14-15 February 2019).

ISMAIL YUSUF COLLEGE MUMBAI

PRINCIPAL
Government of Maharashtra's
Ismail Yusuf College of
Arts, Science & Commerce.
Jogeshwari (East), Mumbai - 400 060

Awards/Recognition

Users

1. **"SJC Poster Presentation Award"**, "Structural and Magnetic properties of $CoFe_{2-x}Ho_xO_4$ synthesized by sol-gel combustion routes". Silver Jubilee Conference held at Indore centre of UGC-DAE CSR, during November 03-06, 2016.