Profile Summary

1. Name: S. Jemima Balaselvi Juliana, M.Sc., Ph.D, PGDCA
2. Designation: Associate Professor in Chemistry
3. Institution: The American College, Madurai
4. Email: jemimabalaselvijuliana@americancollege.edu.in
5. Mobile: 9443976827
6. Area of Specialisation:

   Teaching – Inorganic Chemistry (Solid State, Coordination)

   Research – Material Science, Instrumentation
7. Teaching Experience: 17 yrs
8. Research Experience: 21 yrs
9. International Publications: 8
10. Conference papers: 18
11. Program Organised: 11
12. M.Phil students guided: 3

Curriculum Vitae

A. GENERAL INFORMATION

a) Name : S. Jemima Balaselvi Juliana

b) Address (Residential) : 5, Periyar Street, Thiru Kannan Nagar
Thirupalai,
Madurai – 17

c) Designation : Associate Professor in Chemistry
The American College, Madurai

d) Date of Birth : 24-11-1974

e) Area of specialization : Inorganic Chemistry

B. ACADEMIC QUALIFICATION

Exam Passed	**Board/University**	**Subject/Year**	**Grade**
High School	Board of Matriculation Examination, TN	1990	75% (I)
Higher Secondary	Board of Higher Secondary Examination, TN	Phy, Chem, Bio, Math- 1992	88.67%
Bachelor's degree	Madurai Kamaraj University	Chemistry - 1992-1995	84.4% (I-D)
Master's degree	Madurai Kamaraj University	Chemistry - 1995-1997	83% (I)
Ph.D	Madras University	Chemistry/Material Science- 2005	
PGDCA	Manonmaniam Sundaranar University	1997-1998	83% (I)
GATE 1997			83.7 percentile

C. RESEARCH EXPERIENCE & TRAINING

RESEARCH STAGE	TITLE OFWORK/THESIS	UNIVERSITY WHERE THE WORK WAS CARRIED OUT
Ph.D	Studies on Magnesium diboride and related systems	Materials Science Division, Indira Gandhi Center for Atomic Research Kalpakkam.

Research guidance M.Phil	1. Synthesis and characterization of metal oxides 2. Mixed ligand complexes of Cu(II) and Ni(II) with Aspirin, Salbutamol and Amino acids – Preparation, Characterisation and Antibacterial studies 3. Synthesis, Spectral Characterisation and Antibacterial studies of Mixed ligand complexes of Cu(II) and Ni(II) with Aspirin, Salbutamol and Sulphur containing Amino acids	Post Graduate & Research Department of Chemistry The American College Madurai Post Graduate & Research Department of Chemistry The American College Madurai Post Graduate & Research Department of Chemistry The American College Madurai
Training	1. Acquired skill in programming using Labview & Matlab 2. Got trained in the instrumentation of low temperature measurement viz., 4K-300K of resistivity and TEP	Materials Science Division Indira Gandhi Center for Atomic Research Kalpakkam.

D. RESEARCH PROJECTS CARRIED OUT

Title of the Project	Name of funding agency	Duration	Remarks
Minor Project Synthesis of Pristine and Substituted MgB_2 thinfilms through electrochemical deposition.	UGC	2007-2009	Dr. Bosco Bharathy – Principal investigator Dr. S. Jemima – coinvestigator Project completed

E. TEACHING EXPERIENCE

Courses taught	Name of Institution	Duration
1. UG (B.Sc.,)	The American College, Madurai-2	From 13-Sept-2004 till date
2. PG (M.Sc.,)	The American College, Madurai-2	From 13-Sept-2004 till date
3. M.Phil	The American College, Madurai-2	From June-2008 till date

List of Publications

Papers Published in International Journals:

1. Metal insulator transition in $Fe_2VAl_{1-x}Si_x$ – **S.Jemima**, Awadhesh Mani, A.Bharathi, Nithya Ravindran, Y.Hariharan, Journal of Alloys and Compounds 326 (2001) 18 3-187.
2. Carbon solubility and superconductivity in MgB_2 – A.Bharathi, **S.Jemima Balaselvi**, S.Kalavathi, G.L.N.Reddy, V.Sankara Sastry, Y.Hariharan, T.S.Radhakrishnan – Physica C 370 (2002) 211-218.
3. Synthesis and search for superconductivity in LiBC– A.Bharathi, **S.Jemima Balaselvi**, M.Premila, T.N.Sairam, G.L.N.Reddy, C.S.Sundar, Y.Hariharan, Solid State Communication124 (2002) 423-428.
4. Superconductivity in MgB_2 : Phonon modes and influence of carbon doping – A.Bharathi, Y.Hariharan, **S.Jemima Balaselvi**, C.S.Sundar, Sadhana Vol 28, Parts 1&2, February/April 2003, 263-272.
5. Peculiarities in the carbon substitution of MgB_2 – **S.Jemima Balaselvi**, N.Gayathri, A.Bharathi, V.Sankara Sastry, Y.Hariharan, Physica C 407 (2004) 31-38.
6. Stoichiometric carbon substitution in MgB_2 – **S.Jemima Balaselvi**, N.Gayathri, A.Bharathi, V.S.Sastry, Y.Hariharan, Superconductor Science and Technology, 17(12) (2004) 1401.
7. Study of Phytoconstituents and antibacterial activity of *Kappaphycus alvarezii* - N. Jennifer Michellin Kiruba, M. Andrew Pradeep, **S. Jemima Balaselvi Juliana**, International Journal of Current Microbiology and Applied Sciences, ISSN: 2319-7706 4(5) (2015) 1209-1217.
8. Physical characterization and kinetics studies of Zn(II) biosorption by Morganella morganii ACZ05 – D. Ramya, A. Joseph Thatheyus, S. Jemima Balaselvi Juliana, N. Jennifer Michellin Kiruba, A. Deborah Gnana Selvam, Water Science & Technology, ISSN 0273-1223, E-ISSN 1996-9732, 85(4) (2022), 970-986, https://doi.org/10.2166/wst.2022.031.

Papers presented in Conferences:

1. Carbon solubility and it's effect on superconductivity in MgB_2 – **S.Jemima Balaselvi**, A.Bharathi, S.Kalavathi, G.L.N.Reddy, V.Sankara Sastry, Y.Hariharan, T.S.Radhakrishnan, Solid State Physics (India), 44 (2001) 359.
2. Study of Boron Intercalation in Mg_2Si – **S.Jemima Balaselvi**, A.Bharathi, G.L.N.Reddy, V.Sankara Sastry, Y.Hariharan, T.S.Radhakrishnan, Solid State Physics (India), 44 (2001) 105.

3. Effect of 4d transition metal substitution in MgB_2 – S.Kalavathi, A.Bharathi, **S.Jemima Balaselvi**, G.L.N.Reddy, V.Sankara Sastry, Y.Hariharan, T.S.Radhakrishnan, Solid State Physics (India), 44 (2001) 357.

4. Effect of electron and hole doping on the superconducting and normal state properties of MgB_2 - **S.Jemima Balaselvi**, A.Bharathi, V.Sankara Sastry, G.L.N.Reddy, Y.Hariharan, Solid State Physics (India), Vol 45, (2002) 383.

5. Labview automation of low temperature resistivity measurements – A.Bharathi, S.Jemima Balaselvi, Y.Hariharan, Solid State Physics (India), Vol 45, (2002) 167.

6. Virtual instrument based automation for low temperature resistivity experiments – J.Jayapandian, R.Mallika, **S.Jemima Balaselvi**, A.Bharathi – Journal of the Instrument Society of India, Vol 33, (2003) 176.

7. Raman Studies in $MgB_{2-x}C_x$, T. Sakuntala, S.K. Deb, A. Bharathi, **S.Jemima Balaselvi**, C. S. Sundar, Y.Hariharan, Solid State Physics (India), Vol 46, (2003).

8. Transport studies in Na_xCoO_2 – **S.Jemima Balaselvi**, N.Gayathri, A.Bharathi, V.Sankara Sastry, Y.Hariharan, Solid State Physics (India), Vol 46, (2003).

9. Positron annihilation studies in Na_xCoO_2– R.Rajaraman, A.Bharathi, **S.Jemima Balaselvi**, C.S.Sundar, Solid State Physics (India), Vol 46, 2003.

10. Electrochemical studies on the deposition of metal, P. Silviya Reeta, J.R. Bosco Bharathy, **S. Jemima Balaselvi**, Frontier Areas in Chemistry, UGC sponsored National seminar, March 1-2, 2007, Thiagarajar College, Madurai-9

11. Installation and profiling of a tubular furnace, P. Silviya Reeta, **S. Jemima Balaselvi**, Frontier Areas in Chemistry, UGC sponsored National seminar, March 1-2, 2007, Thiagarajar College, Madurai-9

12. Electrochemical deposition and characterization of the Li-B-C ternary phase, J. Nimitha, S. Sudha, **S. Jemima Balaselvi**, NSFAC, Jan 10-11, 2008, The American College, Madurai-2

13. Electrochemical deposition and characterization of the Mg-B binary phase, S. Sudha, J. Nimitha, **S. Jemima Balaselvi**, NSFAC, Jan 10-11, 2008, The American College, Madurai-2

14. Synthesis, spectral characterisation and biological activity of copper complexes of anti inflammatory drug aspirin and amino acids, C. Suchitra, D. Ponpriya, **S.Jemima Balaselvi**, DRDO sponsored National workshop on Recent Trends in Inorganic Materials, March 15-16, 2012, National Engineering College, Kovilpatti.

15. Synthesis and characterisation of copper oxide nano particles from copper acetyl acetonate precursor and a capping agent, K. Santhiya Esther, M. Preethi, **S. Jemima Balaselvi**, ICNEEC, Dec 11-12, 2015, Madurai Kamaraj University, Madurai-21.

16. Synthesis and characterisation of 12-heteropolyacids of tungsten and molybdenum, V. Sakthi, K.Keerthana, **S. Jemima Balaselvi**, International conference on Modern Trends in Chemistry, MTC-25, February 23, 2018 Vivegananda College, Thiruvedagam, ISBN 978-81-933998-6-6.

17. Stability studies of MolybdoCopper^{II} borate in aqueous medium by UV-Vis spectroscopy, V. Sakthi, **S. Jemima Balaselvi**, International Conference on Frontier Areas in Chemistry, July 17-19, 2018, American College, Madurai-2.

18. Synthesis and Characterisation of Cu^{II} incorporated Molybdoborate, N. R. Sivaram, G.M. Ranjitha Banu, **S. Jemima Balaselvi**, SERB sponsored National seminar on Emerging Trends in Bioinorganic and Pharmaceutical Chemistry (ETBPC-2019), February 27-28, 2019, VHNSN College (Autonomous), Virudhunagar.

Work shop / Symposium attended:

1. SERC School on Precision Physical Measurements and Measurement Science, National Physical Laboratory, New Delhi, 4-23rd December 2000.

2. Workshop on Enhancing Personal Excellence in Classroom Communication Skills of College Teachers, Christ College, Center for Education Beyond Curriculum, Bangalore, 5-7th October 2006.

3. Workshop on Gender Awareness for Career Women, The American College, Madurai, 11 & 12 January 2007.

4. National Seminar on Sexual Harassment of Women at Work Place, All India Institute for Human Values and Resource Development, AIACHE, New Delhi, 25 & 26 August 2017.

5. National conference on Quality Enhancement and Sustenance in Higher Education sponsored by NAAC, IQAC The American College, Madurai, 6 March 2020.

Programs Organised

1. National Seminar on Frontier Areas in Chemistry (NSFAC), at The American College, Madurai, 10th- 11th January 2008.
2. National workshop on “Applications of Nano Particle, Materials & Sensors” sponsored by DST, CSIR, UGC & DRDO, at The American College, Madurai, 7th – 8th December 2012.
3. International Conference on Frontier Areas in Chemistry (ICFAC-2018), at The American College, Madurai, 17th- 19th July 2018.
4. International Conference on Frontier Areas in Chemistry (ICFAC-2019), at The American College, Madurai, 5th July 2019
5. INSPIRE Internship Science Camp sponsored by Department of Science and Technology, New Delhi at The American College, Madurai, 15th – 9th January 2020.

6. Webinar on “Electroanalytical Techniques”, at AMERICAN COLLEGE CENTRAL INSTRUMENTATION CENTRE (ACCIC), 24-06-2020.
7. Webinar on “Spectroscopic Techniques”, at AMERICAN COLLEGE CENTRAL INSTRUMENTATION CENTRE (ACCIC), 07-07-2020.
8. Webinar on “Spectroscopic Techniques-II”, at AMERICAN COLLEGE CENTRAL INSTRUMENTATION CENTRE (ACCIC), 08-07-2020.
9. Webinar on “Analytical Techniques”, at AMERICAN COLLEGE CENTRAL INSTRUMENTATION CENTRE (ACCIC), 09-07-2020.
10. Practical Workshop – 1 on Molecular Techniques in Life Sciences, at AMERICAN COLLEGE CENTRAL INSTRUMENTATION CENTRE (ACCIC), 20th & 21st April 2021.
11. Three days Online workshop on Xray Diffraction, at AMERICAN COLLEGE CENTRAL INSTRUMENTATION CENTRE (ACCIC), 30th-31st July & 2nd August 2021.

Talk presented

1. Presented a talk on “An Introduction to Material Science”, American College Chemistry Webinar Series – 1, 16-05-2020.
2. Resource person for the topic “Coordination Chemistry”, Faculty Development Program on Nuances in Chemistry Teaching, sponsored by Department of Biotechnology, Ministry of Science & Technology, New Delhi, India and organised by Department of Chemistry, St. Mary’s College (Autonomous), Thoothukudi, 23-06-2021.

Book edited

1. A Laboratory Manual, Proceedings of the Practical Workshop – 1 on Molecular Techniques in Life Sciences, ISBN 978-93-80368-40-2.

MOOC

1. Completed the 12 weeks NPTEL online course “Inorganic Chemistry of Life: Principles and Perspectives”, Jul-Oct 2018 conducted by IIT Bombay.

Orientation/Refresher Courses

1. Completed the UGC sponsored Orientation course from 09-02-2011 to 08-03-2011 and obtained A grade, Academic Staff College, Madurai Kamaraj University, Madurai.
2. Completed the UGC sponsored Refresher course in Current Trends in Chemistry from 12-07-2012 to 01-08-2012 and obtained A grade, Academic Staff College, Madurai Kamaraj University, Madurai.
3. Completed the UGC sponsored Refresher course in Recent Trends in Environmental Studies (ID) from 11-03-2016 to 31-03-2016 and obtained A grade, Academic Staff College, Madurai Kamaraj University, Madurai.
4. Completed the two-week online Faculty Development Program (equivalent to Refresher course) on “Chemistry – The catalyst for change” from 14 – 28 July 2021 and obtained A+ grade, Teaching Learning Centre, Ramanujan College, University of Delhi, in

collaboration with Department of Chemistry, Miranda House, University of Delhi, under the aegis of Ministry of Education, Pandit Madan Mohan Malaviya National Mission on Teachers and Teaching.

DUPLICATE

University of Madras

சென்னைப் பல்கலைக்கழகம்

அறிவியல் .... புலம்

FACULTY OF SCIENCE

2005 ஆம் ஆண்டில் **சென்னைப் பல்கலைக்கழகத்தில்** ஆய்வு நிகழ்த்தி வழங்கிய **ஆய்வேட்டுக்காக முனைவர் பட்டம்** பெறத் தகுதியுடையவர் என்று தக்க தேர்[illegible]ர்களால் சான்றளிக்கப்பட்டு **ஜெமிமா பாலசெல்வி ஜிலியானா எஸ்** என்[illegible]வருக்கு **முனைவர் பட்டம்** அளிக்கப்படுகிறது என்று சென்னைப் பல்கலைக்கழகப் பேரவை அறி[illegible]க்கிறது.

செ[illegible]னைப் பல்கலைக்கழக இலச்சினையுடன், சென்னையில் 2006 ஆம் ஆண்டு [illegible]மார்ச் திங்கள் 30 ஆம் நாள் அளிக்கப்பட்டது.

The Senate of the University of Madras hereby makes known that **JEMIMA BALASELVI JULIANA S** *has been conferred the*

DEGREE OF DOCT[illegible]F PHILOSOPHY

he/she having been certified by duly appointed examiners to be qualified to receive the same in the year 2005.

Given under the seal of the University of Madras, at Chennai this [illegible]0th *day of* March 2006.

Title of the Thesis :
ஆய்வுத் தலைப்பு
"Studies on Magnesium Diboride and Related Systems"
(Chemistry - Materials Science) Inter-disciplinary

Prasad
பதிவாளர்
Registrar

(Sd-----------)
S.P.THYAGARAJAN
துணை வேந்தர்
Vice-Chancellor

University Grants Commission

ACADEMIC STAFF COLLEGE

Madurai Kamaraj University
(University with Potential for Excellence)

UGC SPONSORED ORIENTATION COURSE

CERTIFICATE OF PARTICIPATION

This is to certify that **Dr.(Mrs). S.Jemima Balaselvi Juliana**

Assistant Professor in Chemistry **American College, Madurai**

Participated in the Orientation Programme From **09.02.2011** *to* **08.03.2011**

and obtained Grade 'A'

Date : **08.03.2011**
Madurai.

Director **Registrar** i/c **Vice-Chancellor**

University Grants Commission

ACADEMIC STAFF COLLEGE

Madurai Kamaraj University

(University with Potential for Excellence)

UGC SPONSORED REFRESHER COURSE

CERTIFICATE OF PARTICIPATION

This is to certify that **Dr. S. Jemima Balaselvi Juliana**

Assistant Professor of Chemistry

The American College (Autonomous), Madurai -2

participated in the Refresher Course in **Chemistry**

on the theme **"Current Trends in Chemistry"**

from **12.07.2012** *to* **01.08.2012**

Grade: A

Date : **01.08.2012**
Madurai.

Course Co-ordinator **Director** **Registrar** **Vice-Chancellor**

University Grants Commission

HUMAN RESOURCE DEVELOPMENT CENTRE

(Formerly Academic Staff College)

Madurai Kamaraj University

(University with Potential for Excellence)

(Re-accredited by NAAC with 'A' Grade in the 3rd Cycle)

UGC SPONSORED REFRESHER COURSE

CERTIFICATE OF PARTICIPATION

This is to certify that **Dr. S. Jemima Balaselvi Juliana**

Assistant Professor of Chemistry

The American College, Madurai – 625 002

participated in the Refresher Course in **Environmental Studies (ID)**

on the theme **"Recent Trends in Environmental Studies"**

from **11.03.2016** *to* **31.03.2016**

Subject: **Chemistry**

Grade: A

Date : **31.03.2016**

Madurai.

Course Co-ordinator

Director

Registrar

Elite

NPTEL Online Certification

(Funded by the Ministry of HRD, Govt. of India)

This certificate is awarded to

S. JEMIMA BALASELVI JULIANA

for successfully completing the course

Inorganic Chemistry of Life: Principles and Perspectives

with a consolidated score of **60 %**

Online Assignments	**24.18/25**	*Proctored Exam*	**35.5/75**

Total number of candidates certified in this course: **12**

Sridhar

Prof. Sridhar Iyer
Head CDEEP & NPTEL Coordinator
IIT Bombay

Jul-Oct 2018
(12 week course)

Indian Institute of Technology Bombay

FREE ONLINE EDUCATION
swayam
शिक्षित भारत, उन्नत भारत

Roll No: NPTEL18CY14S21600774

To validate and check scores: http://nptel.ac.in/noc

सत्यमेव जयते
Ministry of Education
Government of India

Teaching Learning Centre, Ramanujan College
University of Delhi
In collaboration with
Department of Chemistry, Miranda House
University of Delhi
under the aegis of
MINISTRY OF EDUCATION
PANDIT MADAN MOHAN MALAVIYA NATIONAL MISSION ON TEACHERS AND TEACHING

This is to certify that

Dr. S. Jemima Balaselvi Juliana

of

Department of Chemistry, The American College, Madurai-625002

has successfully completed online TWO - WEEK FACULTY DEVELOPMENT PROGRAMME (equivalent to Refresher Course) on

“Chemistry - The Catalyst for Change”

from *14 – 28 July, 2021* and obtained Grade *A+*.

Blockchain Hash: 0x1966185367468ddad94ed755944c2979b53d5cd63a53d3e4cf0088de4108dc21

SpAggarwal
Prof. S. P. Aggarwal
(Principal & Director)
TLC, Ramanujan College

Dr. Ashish Kumar Shukla
(Convener)
Ramanujan College

Dr. Mallika Pathak
(Convener)
Miranda House

ELSEVIER

Journal of Alloys and Compounds 326 (2001) 183–187

Journal of
ALLOYS
AND COMPOUNDS

www.elsevier.com/locate/jallcom

Metal insulator transition in $Fe_2VAl_{1-x}Si_x$

S. Jemima, Awadhesh Mani, A. Bharathi*, Nithya Ravindran, Y. Hariharan

Materials Science Division, Indira Gandhi Centre for Atomic Research, Kalpakkam 603 102, Tamil Nadu, India

Received 3 July 2000; accepted 18 October 2000

Abstract

Resistivity and ac susceptibility measurements have been carried out in the 4.2 to 300 K temperature range for several samples in the series $Fe_2VAl_{1-x}Si_x$ for $0 < x < 1$. All samples crystallise in the DO_3 structure, with the lattice parameter showing a systematic linear decrease with Si substitution. The magnitude of the room-temperature resistivity, which is 3.4 mΩ cm for Fe_2VAl, decreases drastically even for 1% Si substitution. The temperature-dependent resistivity shows a negative temperature co-efficient for Fe_2VAl, which turns positive for samples with $x > 0.05$. The ac susceptibility measurements show that Fe_2VAl is non-magnetic, while they indicate the formation of a ferrimagnetic phase for $x = 0.04$, with $T_c \sim 4$ K. The results are discussed in the light of currently known models of the electronic structure of these systems. © 2001 Elsevier Science B.V. All rights reserved.

Keywords: Ac susceptibility; Resistivity; Ferrimagnetism

1. Introduction

The recently reported electronic properties of Fe_2VAl are unusual, for example the resistivity increases by a factor of 6–8 as the sample is cooled from 400 to 0.3 K [1,2], characteristic of a non-metal, and the sample remains non-magnetic up to to 2 K. The similarity of these properties to that of FeSi suggests that Fe_2VAl could be yet another Kondo insulator [3], involving 3d electrons. Unlike for FeSi, NMR spectroscopy [4] and photoemission spectroscopy [1] indicate the presence of a finite density of electron states at the Fermi level and imply that Fe_2VAl is a low carrier density semi-metal. Optical reflectivity data show the presence of a pseudogap 0.1–0.2 eV in magnitude with a small, albeit finite, density of states inside the gap [5]. Further, these results reiterate that the gap is not temperature dependent unlike that seen in Kondo insulators [6]. Low temperature specific heat measurements show a maximum in the C/T versus T^2 plot and a large γ, which is characteristic of heavy fermion metallic systems [1,2,7]. Band structure calculations indicate that the system could be a low carrier density semi-metal, having a deep pseudogap with E_f in the middle of the gap [8,9]. Although most experimental facts can be consistently explained using the results from band structure, the negative temperature coefficient of the resistivity and the intriguing low temperature specific heat results are not easily understood. Several conjectures have been put forward to understand this: spin-glass behaviour at low temperature arising as a consequence of the presence of Fe clusters due to Fe/V anti-site disorder [8] which could give rise to anomalous electron scattering resulting in an increase in resistivity with decreasing temperature. Alternatively, the negative temperature coefficient of the resistivity is thought to arise due to excitonic correlations between electrons and holes residing at V and Fe sites [9], inhibiting charge transport. Yet another reason envisaged for the negative temperature coefficient of the resistivity is that the electron transport behaviour could be due to the detailed shape of the density of states near the pseudogap [9]. The physical properties of isostructural Fe_2VSi are less controversial [10,11], being metallic with an antiferromagnetic transition at 120 K [11]. Here we investigate the $Fe_2VAl_{1-x}Si_x$ system with a view to studying the evolution of the ground state of Fe_2VAl as it systematically evolves from Fe_2VSi by Al substitution on the Si site. The

---

*Corresponding author. Tel.: +91-411-440-369; fax: +91-411-440-381.

E-mail address: bharathi@igcar.ernet.in (A. Bharathi).

0925-8388/01/$ – see front matter
PII: S0925-8388(01)01245-2

6

ELSEVIER

Physica C 370 (2002) 211–218

PHYSICA C

www.elsevier.com/locate/physc

Carbon solubility and superconductivity in MgB_2

A. Bharathi [*], S. Jemima Balaselvi, S. Kalavathi, G.L.N. Reddy,
V. Sankara Sastry, Y. Hariharan, T.S. Radhakrishnan

Materials Science Division, Indira Gandhi Centre for Atomic Research, Kalpakkam 603102, India

Received 1 February 2002; accepted 12 February 2002

Abstract

Successful replacement of B by C in the series $MgB_{2-x}C_x$ for values of x upto 0.3 is reported. Resistivity and ac susceptibility measurements have been carried out in the samples. Solubility of carbon, inferred from the observed change in the lattice parameter with carbon content indicates that carbon substitutes upto $x = 0.30$ into the MgB_2 lattice. The superconducting transition temperature, T_c measured both by zero resistivity and the onset of the diamagnetic signal shows a systematic decrease with increase in carbon content upto $x = 0.30$, beyond which the volume fraction decreases drastically. The temperature dependence of resistivity in the normal state fits to the Bloch–Gruneisen formula for all the carbon compositions studied. The Debye temperature, θ_D, extracted from the fit, is seen to decrease with carbon content from 900 to 525 K, whereas the electron–phonon interaction parameter, λ, obtained from the McMillan equation using the measured T_c and θ_D, is seen to increase monotonically from 0.8 in MgB_2 to 0.9 in the $x = 0.50$ sample. The ratio of the resistivities between 300 and 40 K versus T_c is seen to follow the Testardi correlation for the C substituted samples. The decrease in T_c is argued to mainly arise due to large decrease in θ_D with C concentration and a decrease in the hole density of states at $N(E_F)$. © 2002 Elsevier Science B.V. All rights reserved.

Keywords: MgB_2; Transport properties; Transition temperature variations

1. Introduction

The recent discovery of superconductivity at 39 K in MgB_2 has initiated a flurry of activity aimed at understanding the origin of the large T_c [1]. Several experimental studies, notably the isotope effect [2] and the pressure dependence [3] of T_c point to the fact that superconductivity in this system is largely governed by the conventional electron–phonon mechanism and that the high T_c is a consequence of the large hole density of states arising from the sigma bands of boron and high phonon frequency arising on account of the low mass [4–6]. There have been several theoretical predictions of an increase in T_c by chemical substitutions at the Mg and B sublattice [6,7]. There have been experimental reports of substituting Mg by Al [8,9], Li [10,11], Si [10], 3d transition metals [12–14] and recently 4d transition metals [15]. Almost all substitutions have led to a decrease in T_c, with an exception of Zn [14], which shows no change even for 30% substitution. Our study has shown that ~5% substitution of Nb [15] at the Mg site, in MgB_2, results in a small albeit definite

---

[*] Corresponding author.
E-mail address: bharathi@igcar.ernet.in (A. Bharathi).

PII: S0921-4534(02)01139-5

INSTITUTE OF PHYSICS PUBLISHING SUPERCONDUCTOR SCIENCE AND TECHNOLOGY

Supercond. Sci. Technol. **17** (2004) 1401–1405 PII: S0953-2048(04)82048-7

Stoichiometric carbon substitution in MgB_2

S Jemima Balaselvi, N Gayathri, A Bharathi[1]**, V S Sastry and Y Hariharan**

Materials Science Division, Indira Gandhi Centre for Atomic Research, Kalpakkam 603102, India

E-mail: bharathi@igcar.ernet.in

Received 10 June 2004
Published 6 October 2004
Online at stacks.iop.org/SUST/17/1401
doi:10.1088/0953-2048/17/12/007

Abstract

Carbon has been substituted into the MgB_2 lattice, forming the series $Mg(B_{1-x}C_x)_2$, by heat treatments in sealed Ta tubes starting with elemental constituents. The superconducting transition temperature, T_C, was measured by diamagnetic susceptibility. The superconducting transitions are sharp and the x-ray diffraction on the samples show only trace amounts of impurity phases. The C fraction that substitutes the B atoms into the MgB_2 lattice, as determined from the now well established correlation between the 'a' lattice parameter and x in $Mg(B_{1-x}C_x)_2$ is found to be very close to the targeted values. The temperature dependence of the normalized resistance is similar to that seen in C doped MgB_2 single crystals along the ab plane. $R_n/R(300\text{ K})$, where R_n is the resistance just above T_C, increases with x.

1. Introduction

Ever since the discovery of superconductivity in MgB_2 [1] three years ago, many experiments have been carried out which has brought about a good understanding of the physics underlying these materials [2]. From the materials point of view MgB_2 stands alone like an island. Chemical substitutions at specific crystallographic sites that lead to a variety and richness in the high temperature superconductors is not easily possible in MgB_2 [3]. The interest in chemical substitution of this material is still alive as the $H_{C2}(0)$ of pristine MgB_2 is small ∼15 T [4] and the critical current density is strongly depressed at low magnetic fields. It is possible to enhance $H_{C2}(0)$, by chemical substitution, but in MgB_2, the presence of two superconducting gaps arising from two bands with different dimensionality and equal density of states at the Fermi level, does not make the choice of the right substituent that straightforward [5]. Substitutions aimed at enhancing $H_{C2}(0)$ should not lead to inter-band scattering which could bring about a reduction in T_C in a two gap scenario. Of all the chemical substitutions that have been undertaken, Al and C substitutions have been successful both in polycrystalline [6–10] and single crystalline forms [11–13], and both of them have resulted in a decrease in T_C. One of the plausible reasons for a reduction in T_C due to Al substitution is believed to arise from increased inter-band scattering, making it an unsuitable substituent to enhance $H_{C2}(0)$ [14]. In fact it has been recently observed in single crystalline $Mg_{1-x}Al_xB_2$ that Al substitution leads to a reduction in $H_{C2}(0)$ [15].

On the other hand, recent experiments that have substituted carbon into MgB_2 using B_4C as the precursor have shown that a carbon fraction of $x \sim 0.12$ substitutes into the $Mg(B_{1-x}C_x)_2$ lattice and that the $H_{C2}(0)$ can be increased to 25–30 T [16]. In single crystalline samples the H_{irr} is shown to increase for small C content [17]. For $x = 0.01$ to 0.035 made in polycrystalline form on tungsten wires, it has been shown that the $H_{C2}(0)$ increases with C content to 32 T [10]. There is thus a clear need to device a method for fabrication of $Mg(B_{1-x}C_x)_2$ for a wide range of C content and therefore optimize $H_{C2}(0)$ and T_C. Even though the B_4C route of synthesis has yielded a high $H_{C2}(0)$, it is not possible to obtain a systematic variation in the C concentration and hence optimize $H_{C2}(0)$. Further, as mentioned above, in this method of synthesis, a maximum C fraction of $x = 0.12$ has been attained, with the remaining C forming impurity phases, namely Mg_2C_3 and MgB_2C_2. In the wire samples prepared by chemical vapour deposition of B–C onto the tungsten wires,

---

[1] Author to whom any correspondence should be addressed.

PERGAMON

Solid State Communications 124 (2002) 423–428

solid
state
communications

www.elsevier.com/locate/ssc

Synthesis and search for superconductivity in LiBC

A. Bharathi*, S. Jemima Balaselvi, M. Premila, T.N. Sairam, G.L.N. Reddy, C.S. Sundar, Y. Hariharan

Materials Science Division, Indira Gandhi Centre for Atomic Research, Kalpakkam 603102, Tamilnadu, India

Received 24 July 2002; received in revised form 26 August 2002; accepted 27 August 2002 by A.K. Sood

---

Abstract

Following the recent theoretical prediction of superconductivity in hole doped LiBC by Rosner et al. [Phys. Rev. Lett. 88 (2002) 127001], we have attempted to synthesize Li deficient Li_xBC ($x = 1, 0.8, 0.6$ and 0.4) and looked for superconductivity in this system. Our synthesis procedure, following the recipe for MgB_2, involves reaction of elemental components in a Ta crucible at 900 °C under 50 bar of argon pressure. X-ray diffraction measurements indicate the formation of $P6_3/mmc$ structure up to $x = 0.6$. However, no diamagnetic signal or zero resistance, corresponding to the superconducting transition, were observed in the temperature range of 4–300 K. This is possibly related to the presence of disorder in the B–C stacking; evidence for which is suggested from a study of the vibrational modes of Li_xBC through infrared spectroscopy. © 2002 Elsevier Science Ltd. All rights reserved.

PACS: 74.10. + v; 74.70. − b; 78.30. − j; 61.10. − i

Keywords: A. Superconductors; B. Chemical synthesis; E. X-ray diffraction; E. Resistivity; E. Infrared spectroscopy; D. Phonons

---

1. Introduction

Since the discovery of superconductivity in MgB_2 [2,3] there has been a serious effort to unravel the mechanism of superconductivity in this compound [4]. This high T_c in MgB_2, is believed to arise due to strong electron–phonon coupling of the holes in the σ band with the bond stretching E_{2g} modes in the B planes [5]. Electronic band structure calculations [5] also show that the hole density of states is two-dimensional in character, the energy dependence is flat below E_F, but falls off above suggesting that the density of states at E_F, $N(E_F)$, is not expected to change with hole doping, whereas it will decrease with electron doping. Attempts to increase T_c in MgB_2 by chemical substitution have not thus far been successful. T_c is observed to decrease by electron [6,7] doping, as seen in Al and C substitution experiments. By the substitution of Li, which corresponds to hole doping [8] T_c remains constant. Whereas by Be substitution, which also results in hole doping [9], T_c shows a precipitous decrease [10], which is understood in terms of a decrease in the electron–phonon coupling strength [11]. It therefore appears that the route to increase T_c is to increase the electron–phonon coupling strength with the hole concentration remaining fixed at least at the MgB_2 value. Along these lines [11] it was suggested that the $CuB_{2-x}C_x$ system would be a likely candidate for high T_c, with Cu substitution resulting in the right magnitude of $N(E_F)$, but with an increased electron–phonon coupling due to the C substitution of the B layers. Experimental verification of these ideas has been hampered by the lack of solubility of Cu in MgB_2 and the fact that the $CuB_{2-x}C_x$ compound does not form. The T_c in other iso-structural di-borides viz. ZrB_2 [12], TaB_2 [13] and MoB_2 stabilized with 4% Zr [14] have been disappointingly low. This is rationalized, based on their electronic structure [15,16], to arise because the 4d electrons of the transition metals span the Fermi level and that the σ bonding electrons of B are ~2–4 eV below E_F.

Recently band structure calculations [1], have suggested a possibility of the occurrence of superconductivity in an iso-structural compound LiBC. The electron count in LiBC is identical to that in MgB_2 with Li providing one electron less than Mg, and the replacement of B with C, providing the extra electron. Stoichiometric LiBC is a large gap semiconductor [1,17], and it has been reported [1,17] that

---

* Corresponding author. Tel.: +91-4114-481192; fax: +91-4114-480081.

E-mail address: bharathi@igcar.ernet.in (A. Bharathi).

0038-1098/02/$ - see front matter © 2002 Elsevier Science Ltd. All rights reserved.
PII: S0038-1098(02)00474-X

Sādhanā Vol. 28, Parts 1 & 2, February/April 2003, pp. 263–272. © Printed in India

Superconductivity in MgB_2: Phonon modes and influence of carbon doping

A BHARATHI, Y HARIHARAN, JEMIMA BALASELVI and
C S SUNDAR

Materials Science Division, Indira Gandhi Centre for Atomic Research,
Kalpakkam 603 102, India
e-mail: css@igcar.ernet.in

Abstract. Following a brief overview, results of our investigations on phonon modes in MgB_2, and superconducting transition in carbon doped MgB_2 are presented. The superconducting transition temperature in $MgB_{2-x}C_x$ as obtained from susceptibility and resistivity measurements is observed to decrease systematically from 39·4 K for $x = 0$ to 26 K for $x = 0{\cdot}5$. It is shown the changes in lattice volume, as obtained from x-ray diffraction measurements, can account only partially for the observed decrease in T_c. The observed variation of T_c with carbon content is seen to correlate with the Debye temperatures, obtained from an analysis of the resistivity data.

Investigation of the phonon modes in MgB_2, through infrared absorption measurements indicate three modes at 410, 475 and 560 cm^{-1}. The former two are associated with the infrared active modes, and the third component is associated with the Raman mode, that gets activated due to disorder. A study of the temperature dependence of these modes indicates no changes across the superconducting transition. The mode at 560 cm^{-1} shows a significant hardening and a corresponding decrease in linewidth, with the lowering of temperature, that can been accounted in terms of anharmonicity.

Keywords. Superconductivity; MgB_2; carbon-doping; susceptibility; resistivity; infrared spectroscopy.

1. Introduction and overview

The serendipitous discovery of superconductivity at 39K in the binary intermetallic MgB_2 by Nagamutsu *et al* (2001) has initiated a flurry of activity. In a short period of time extensive studies (for a review, see Buzea & Yamashita 2000) have been carried out on the normal state and superconducting properties, which include the determination of the superconducting gap, coherence length, penetration depth and critical fields. Theoretical calculations (An & Pickett 2001; Kong *et al* 2001; Kortus *et al* 2001) indicate that superconductivity in this system can be understood in the framework of electron–phonon interaction. Initial evidence for the importance of electron–phonon interaction was provided by the experiments on boron isotope effect (Bud'ko *et al* 2001) MgB_2 has been syntheised in a variety of forms such as thin films

Available online at www.sciencedirect.com

SCIENCE DIRECT®

Physica C 407 (2004) 31–38

PHYSICA C

www.elsevier.com/locate/physc

Peculiarities in the carbon substitution of MgB_2

S. Jemima Balaselvi, N. Gayathri, A. Bharathi [*], V.S. Sastry, Y. Hariharan

Materials Science Division, Indira Gandhi Centre for Atomic Research, Kalpakkam 603102, India

Received 19 February 2004; received in revised form 26 April 2004; accepted 26 April 2004
Available online 1 June 2004

Abstract

To examine the role of kinetics on C substitution into MgB_2, heat treatments at 900 °C on stoichiometric quantities of Mg, B and C forming the $MgB_{2-x}C_x$ series, have been carried out for various times and for different carbon fractions, under an external Ar pressure of 50 Bar. The variation in the superconducting transition temperatures on account of C incorporation into the MgB_2 matrix has been measured using the onset of diamagnetism and the appearance of zero resistance using the a.c. susceptibility and resistivity measurements carried out in the 4–300 K temperature range. The phase purity of the samples and the lattice parameters have been measured by XRD measurements. The microstructure has been characterized by scanning electron microscope observations. The heat treatments carried out on $MgB_{2-x}C_x$ for a nominal composition of $x = 0.3$, indicate that for shorter periods, the superconducting transitions are broad, and with increase in the heat treatment time the transition widths narrow and the onset of diamagnetism shifts to higher temperature reaching a value of 35 K at 50 h. The *a*-lattice parameter shows a corresponding increase with heat treatment time and also attains a constant value between the 24 and 50 h treatments. These results reveal that the extent of carbon substituted into the MgB_2 matrix at shorter times is large whereas for longer annealing times the matrix is depleted in carbon content, with carbon content in the superconducting volume becoming more uniform. These prolonged heat treatments were carried out for several nominal compositions of carbon and the measured T_C decreases to less than 20 K for large carbon contents. The T_C versus *a*-lattice parameter obtained from this work, shows a correlation in agreement with similar measurements on single crystals.

PACS: 74.70.Ad; 74.62.Dh; 74.25.–q
Keywords: MgB_2; Carbon doping; Transition temperature variations

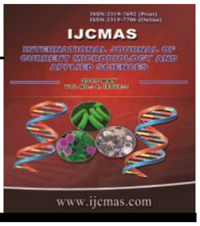
1. Introduction

The study of the superconductivity in MgB_2 has been extensive ever since its serendipitous discovery by Nagamatsu et al. [1]. The nature of superconductivity is fairly well understood in pristine MgB_2 [2], arising from strong electron phonon interaction in the 2D, σ band, which is induced into the 3D, π band, resulting in the now well established, two gap superconductivity. The volatile nature of Mg and the associated difficulty in the synthesis of the material poses difficulties in the

---

[*] Corresponding author. Tel./fax: +91-4114280081.
E-mail address: bharathi@igcar.ernet.in (A. Bharathi).

0921-4534/$ - see front matter © 2004 Elsevier B.V. All rights reserved.
doi:10.1016/j.physc.2004.04.016



International Journal of Current Microbiology and Applied Sciences
ISSN: 2319-7706 **Volume 4 Number 5 (2015) pp. 1209-1217**
http://www.ijcmas.com

Original Research Article

Study of Phytoconstituents and antibacterial activity of *Kappaphycus alvarezii*

N. Jennifer Michellin Kiruba, M. Andrew Pradeep* and S. Jemima Balaselvi Juliana

Postgraduate Department of Immunology and Microbiology, The American College,
Madurai – 625 002, India
**Corresponding author*

ABSTRACT

Keywords

Antibacterial Activity, bioactive , quinones, sterols and isoflavonols

The aim of this investigation was to analyse the antimicrobial activity of *Kappaphycus alvarezii* and to study its bioactive compounds. The crude extracts of *Kappaphycus alvarezii* extracted in ethanol and chloroform was subjected to preliminary phytochemical estimation. Its activity against gram positive and negative bacterial strains of *Escherichia coli*, *Staphylococcus aureus*, *Proteus mirabilis*, *Streptococcus pneumoniae*, *Pseudomonas aeruginosa*, *Vibrio cholerae*, and *Bacillus subtilis* was also investigated. The compounds present were confirmed using HPLC and the functional groups were identified using FT-IR. Phytochemical analysis tested positive for the presence of flavonoids, cardiac glycosides, sterols and quinones. FTIR analysis of the EtOH and $CHCl_3$ extracts of *Kappaphycus alvarezii* showed similar peaks corresponding to functional groups such as amines ($-NH_2$), alcohols (-OH) and carboxyl (-C=O) groups. The qualitative HPLC fingerprint profile of both extracts showed prospective peaks at lower R_f values indicating the major presence of quinones.The results show that, the presence of bioactive quinones, sterols and isoflavonols, lead to active inhibition of microbial growth in a dose-dependent manner.

Introduction

According to WHO report and fact sheet (last updated on April 2014), the causes of antimicrobial resistance (AMR) are several, namely selective pressure, mutation, gene transfer, societal pressures, inappropriate drug use, inadequate diagnostics, hospital use and agricultural use of drugs. The impact of AMR on society and economy is sky-high. It raises the death rate due to common infections, twice than normal and the low awareness among general public is not helping the already deteriorating situation.

Due to unavailability of treatment to resistant forms of microbes, the health care costs and the economic burden on public will further spike specifically in third world countries. In 2050, about 10 million deaths are expected to be due to AMR, which will dominate every other cause of mortality like cancer, road accidents and diabetes. The draft global action plan developed by the World Health Organization to combat antimicrobial resistance (to be submitted to the Sixty-eighth World Health Assembly in May 2015) sets out five strategic objectives.

Water Science & Technology

Water Science & Technology Vol 85 No 4, 970 doi: 10.2166/wst.2022.031

Physical characterization and kinetic studies of Zn (II) biosorption by *Morganella morganii* ACZ05

D. Ramya [c,*], A. Joseph Thatheyus[a], S. Jemima Balaselvi Juliana [b], N. Jennifer Michellin Kiruba [c] and Deborah Gnana Selvam A[c]

[a] Postgraduate & Research Department of Zoology, The American College, Madurai 625 002, Tamil Nadu, India
[b] Postgraduate & Research Department of Chemistry, The American College, Madurai 625 002, Tamil Nadu, India
[c] Department of Microbiology, The American College, Madurai 625 002, Tamil Nadu, India
*Corresponding author. E-mail: ramya.susila@gmail.com

DR, 0000-0003-1653-0826; SJBJ, 0000-0003-0610-0371; NJMK, 0000-0002-9595-7096

ABSTRACT

Through this investigation, we establish the mechanism and physical characterization of zinc (II) sequestration by *Morganella morganii* ACZ05 strain, which was isolated and characterized from soil polluted by effluents from electroplating industries. As far as we know, there is very little literature concerning zinc biosorption using an environmental strain of *M. morganii*. The SEM analysis shows the dark porous gaps in the aggregated cell-matrix of test bacterial biomass which is inferred as water channels usually seen in biofilms, as compared to metal-unexposed control. *M. morganii* is not known to produce biofilms unless in the rare nosocomial conditions. Here, SEM analysis shows the production of biofilms after exposure to zinc (II) at 500 ppm, which has not been previously reported. EDX analysis of bacterial biomass also specified the sorption of zinc (II) by the bacterial cells and the presence of new peaks for zinc in contrast to control. Both XRD and FTIR analysis observations strongly implicate the potential of physical adsorption as a mechanism for heavy metal resistance. Analysis of the cell surface by Atomic force microscopy and examination of the topography revealed cell aggregation occurs during biofilm production after zinc biosorption. Unlike other reports, regular models such as Langmuir isotherm and Freundlich isotherm were found insufficient to explain the physisorption of zinc (II) metal ions on complex multicomponent adsorbents such as the exopolymeric surface of the bacterial cells. However, adsorption kinetics of zinc (II) to the bacterial biomass was most effectively elucidated by a pseudo-second-order kinetic model, suggesting a certain kind of chemisorption that requires further study.

Key words: Biosorption, Freundlich, Langmuir, *M. morganii* ACZ05, SEM/EDX, zinc II)

HIGHLIGHTS

- XRD and FTIR – potential of physical adsorption as a mechanism for heavy metal resistance.
- SEM-EDX and AFM – morphological changes were observed after metal addition.
- The isotherm studies – fit of pseudo-second order for biosorption experimental data suggests the involvement of cellular mechanisms for the activity of binding sites of metal ions and other chemical sorption processes.
- Biosorption, chemisorption,

SERC School

on

Precision Physical Measurements and Measurement Science

December 4-23, 2000

National Physical Laboratory, New Delhi

Sponsored by

Department of Science and Technology, New Delhi

Ms. *S. Jemima* *Ma* [illegible] *Division, IGCAR, Kalpakkam*

attended the SERC School.

Banerji

Dr. P.Banerjee
Director, SERC School

Date : December 23, 2000

Dr. Krishan Lal
Chairman, Advisory Committee
SERC School and
Director, NPL

45th DAE-Solid State Physics Symposium

Panjab University, Chandigarh
December 26-30, 2002

Certificate Of Participation

Presented To

S. JEMIMA, MSD, IGCAR

Symposium Secretary -1
(P.S.R. Krishna)

SECRETARY
DAE - SSP Symposium

Symposium Secretary -2
(P.U. Sastry)

SECRETARY
DAE - SSP

Christ College

(Autonomous)

BANGALORE 560 029

CENTRE FOR EDUCATION BEYOND CURRICULUM

CERTIFICATE

This is to certify that S. JEMIMA BALASELVI *of* THE AMERICAN COLLEGE *has participated in a three day workshop "Enhancing Personal Excellence in Classroom Communication Skills of College Teachers" held from October 5-7, 2006, organized by the Centre for Education Beyond Curriculum, Christ College, Bangalore.*

He / She has actively taken part in the activities.

07 / 10 / 2006.
DATE

Programme Coordinator

Principal

The American College

Madurai - 625 002

GENDER AWARENESS CAMPAIGN

CERTIFICATE

This is to certify that ....Dr. (Ms) Jemina Baloselvi Juliana................. *of the*

........Chemistry................. *Department participated in the Workshop on*

GENDER AWARENESS FOR CAREER WOMEN *on 11 & 12 January 2007.*

Dr. S.Shyamala
Dean of Women Students

Dr. T.Chinnaraj Joseph Jaikumar
Principal & Secretary

THIAGARAJAR COLLEGE (AUTONOMOUS)

DEPARTMENT OF CHEMISTRY

UGC SPONSORED NATIONAL SEMINAR ON

FRONTIER AREAS IN CHEMISTRY

March 1st and 2nd, 2007

Certificate

This is to certify that ~~Mr.~~ / ~~Ms.~~ / Dr. Jemima Balasetti Lecturer in Chemistry of The American college, Madurai has participated and presented a ~~Paper~~ ~~Oral~~ / Poster in the UGC Sponsored National Seminar on **FRONTIER AREAS IN CHEMISTRY** held on March 1 - 2, 2007 at the Department of Chemistry, Thiagarajar college, Madurai - 9, Tamilnadu.

Dr. P. Tharmaraj
Convener

Dr. M. Arunagiri
Principal

THE AMERICAN COLLEGE

Post Graduate and Research Department of Chemistry

TWO DAY NATIONAL WORKSHOP ON

"APPLICATIONS OF NANO PARTICLES, MATERIALS & SENSORS"

(sponsored by DST, CSIR, UGC & DRDO)

December 7th & 8th 2012

Certificate

This is to certify that ~~Mr./Ms.~~/ Dr. S. JEMIMA BALASELVI JULIANA,

ASST. PROFESSOR, THE AMERICAN COLLEGE

participated in the National Workshop on "Applications of Nano Particles, Materials & Sensors" held on December 7th & 8th 2012 at The American College, Madurai, Tamilnadu.

Dr. T.K. Ganesan
Head, PG & Research Dept. of Chemistry

Dr. K. John Adaikalasamy
Convener

Dr. M. Davamani Christober
Principal & Secretary

Since 1881

THE AMERICAN COLLEGE

Department of Chemistry

National Symposium on Frontier Areas in Chemistry – II (NSFAC-II)

(Sponsored by UGC / DST / DRDO)

January 27th & 28th 2014

Certificate

This is to certify that ~~Prof.~~/Dr./~~Mr./Ms.~~ S. JEMIMA BALASELVI JULIANA.

Assistant Professor, The American College

participated & ~~presented paper~~ / ~~poster~~ in the " **National Symposium on Frontier Areas in Chemistry – II (NSFAC-II)**" held on January 27th & 28th 2014 at The American College, Madurai, Tamil Nadu.

Dr. T.K. Ganesan
Head, PG Dept. of Chemistry

Prof. C. A. Pradeep
Co- Convener

Dr. M. Davamani Christober
Principal & Secretary

International Conference on "Nanomaterials for Energy, Environment, Catalysis and Sensors (ICNEECS-15)"

DEPARTMENT OF PHYSICAL CHEMISTRY

MADURAI KAMARAJ UNIVERSITY

(University with Potential for Excellence)
Palkalai Nagar, Madurai - 625 021, Tamil Nadu, INDIA.

Certificate

This is to certify that Mr./Ms./Dr. S. JEMIMA BALASELVI

THE AMERICAN COLLEGE has ~~participated~~ / presented a paper entitled SYNTHESIS & CHARACTERISATION OF COPPER OXIDE NPs FROM COPPER ACETYL ACETONATE PRECURSOR & A CAPPING AGENT as a ~~Oral~~ / Poster presentation in the International Conference on "Nanomaterials for Energy, Environment, Catalysis and Sensors (ICNEECS-15)" conducted by the Department of Physical Chemistry, School of Chemistry, Madurai Kamaraj University, Madurai - 625 021 on 11-12th December 2015.

G. Gnanakumar
CONVENOR
ICNEECS-15

CHAIRMAN
ICNEECS-15

NATIONAL SEMINAR ON "SEXUAL HARASSMENT OF WOMEN AT WORK PLACE"

Sponsored by: United Board for Christian Higher Education in Asia
Hosted by: All India Institute for Human Values & Resource Development
(A Unit of AIACHE)

Certificate

This is to certify that DR. JEMIMA BALASELVI JULIANA. S, THE AMERICAN COLLEGE, MADURAI

participated in the **National Seminar on "SEXUAL HARASSMENT OF WOMEN AT WORK PLACE"**

held at **AIACHE, Ecumenical Centre,** New Delhi on 25 & 26 August, 2017.

Dr. V.M. Spurgeon
Programme Director for the South Asia
United Board

Dr. D. Daniel Ezhilarasu
General Secretary, AIACHE
Exe. Director, AIIHV&RD
New Delhi

Date : 26.08.2017
Place : New Delhi

Since 1881

THE AMERICAN COLLEGE

An Autonomous Institution Affiliated to the Madurai Kamaraj University
Re-Accredited (2nd Cycle) by NAAC with Grade "A" CGPA-3.46 on a 4 point scale
Madurai- 625 002

POST GRADUATE & RESEARCH DEPARTMENT OF CHEMISTRY

Diamond Jubilee (1958 - 2018)
PG & RESEARCH DEPT OF CHEMISTRY

INTERNATIONAL CONFERENCE ON FRONTIER AREAS IN CHEMISTRY (ICFAC-2018)

CERTIFICATE

This is to certify that

Dr./~~Mr.~~/ ~~Ms.~~/ ~~Mrs.~~ S. JEMIMA BALASELVI JULIANA

of THE AMERICAN COLLEGE, MADURAI

has participated / presented a paper (Oral) in the

INTERNATIONAL CONFERENCE ON FRONTIER AREAS IN CHEMISTRY (ICFAC-2018)

organised by the Post Graduate & Research Department of Chemistry,

The American College from 17th to 19th July 2018.

Dr. T. K. Ganesan
Head of the Department

Dr. J. Helen Ratna Monica
Organizing Secretary

Dr. M. Davamani Christober
Principal & Secretary

Since 1881

THE AMERICAN COLLEGE

An Autonomous Institution affiliated to Madurai Kamaraj University
Re- accredited (2nd Cycle) by NAAC with Grade "A" CGPA-3.46 on a 4-point scale)
Madurai-625 002

Department of Chemistry

INTERNATIONAL CONFERENCE ON FRONTIER AREAS IN CHEMISTRY - 2019

Certificate

This is to certify that

Dr/~~Mr~~/~~Ms~~ S. JEMIMA BE [illegible] JULIANA (ASST. PROF.)

of THE AMERICAN COLLEGE

has participated in the INTERNATIONAL CONFERENCE ON

FRONTIER AREAS IN CHEMISTRY (ICFAC-2019)

organised by the Department of Chemistry,

The American College, Madurai on 5th July 2019.

Dr. T.K. Ganesan
Head (PG) Dept. of Chemistry

Dr. M. Davamani Christober
Principal & Secretary

THE AMERICAN COLLEGE

An Autonomous Institution affiliated to Madurai Kamaraj University
Re Accredited (2nd Cycle) by NAAC with Grade "A" CGPA - 3.46 on a 4 point scale
A Mentor Institution
Madurai - 625 002.

Recent Trends in Chemistry (RTC - 2020)

This is to certify that Dr. S. JEMIMA BALASELVI JULIANA, ASSISTANT PROFESSOR of the Department of Chemistry has Participated ~~/ Presented a Poster~~ in one day national symposium on "Recent Trends in Chemistry - 2020" organized by the alumini (13PGC & 14PGC), PG & Research Department of Chemistry on 12th March, 2020.

Dr.T.K.Ganesan
Head, PG & Research Department of Chemistry

Dr.M.Davamani Christober
Principal & Secretary

Since 1881

INTERNAL QUALITY ASSURANCE CELL

THE AMERICAN COLLEGE

(An Autonomous Institution Affiliated to Madurai Kamaraj University) (Re-accredited (2nd Cycle) by NAAC with 'A' CGPA 3.46 on a 4 point scale)

MADURAI, TAMILNADU, INDIA

Certificate

This is to certify that Dr/Mr/Ms S. JEMIMA BALASELVI JULIANA DEPT. OF CHEMISTRY THE AMERICAN COLLEGE *attended / ~~presented a paper titled~~*

in the NAAC sponsored National Conference on

"QUALITY ENHANCEMENT AND SUSTENANCE IN HIGHER EDUCATION" *organized by the Internal Quality Assurance Cell (IQAC), The American College, Madurai, on 6th March 2020.*

Dr. K. Gnanasekar
Co-ordinator, IQAC

Dr. M. Davamani Christober
Principal & Secretary

Since 1881

The American College

(An Autonomous Institution affiliated to Madurai Kamaraj University) (Re-accredited (2nd Cycle) by NAAC with Grade "A" CGPA 3.46 on a 4 point scale)
Madurai - 625 002, India.

INSPIRE

(INnovation in Science Pursuit for Inspired REsearch)

CERTIFICATE OF APPRECIATION

This is to certify that ~~Prof.~~/Dr./~~Mr.~~/~~Ms.~~ S. JEM[illegible] BALASELVI JULIANA of THE AMERICAN COLLEGE, MADURAI. has participated as ~~Intern~~/~~Mentor~~/Organizer/~~Volunteer~~ in the INSPIRE Internship Science Camp sponsored by Department of Science and Technology, New Delhi conducted during 15 – 19 January 2020 at The American College Madurai - 625 002.

Dr. K. John Adaikalasamy
Program Coordinator
Inspire Science Camp - 2020

Dr. M. Davamani Christober
Principal & Secretary

STAR PROGRAMME
2020-2021

Sponsored by

Department of Biotechnology, Ministry of Science & Technology, Govt. of India, New Delhi

Organized by

Department of Chemistry, St. Mary's College (Autonomous), Thoothukudi, Tamil Nadu.

(Reaccredited with 'A+' Grade by NAAC)

Certificate of Appreciation

This is to certify that Dr. S. Jemima Balaselvi Juliana, Associate Professor of Chemistry, The American College, Madurai, has served as a resource person in the Faculty Development Programme on "Nuances in Chemistry Teaching" on the topic "Coordination Chemistry" organized by Department of Chemistry, St. Mary's College (Autonomous), Thoothukudi on 23.06.2021.

Arockia Jenecius Alphonse

Dr.Sr. Arockia Jenecius Alphonse
Overall Star Coordinator

Lucia Rose

Dr. Sr. A.S.J. Lucia Rose
Principal

Since 1881

THE AMERICAN COLLEGE

An Autonomous Institution Affiliated to the Madurai Kamaraj University
Re-Accredited (2nd Cycle) by NAAC with Grade "A" CGPA-3.46 on a 4 point scale
Madurai- 625 002

DEPARTMENT OF CHEMISTRY

American College Chemistry Webinar Series- I

CERTIFICATE

This is to certify that **Dr.(Mrs.)S.Jemima Balaselvi Juliana,** Associate Professor from The American College, Madurai, was a **Resource Person** and presented a talk titled **An introduction to Material Science** in the American College Chemistry Webinar Series organised by the Department of Chemistry, The American College, Madurai, on 16-05-2020

Dr.K.John Adaikalasamy
Head, Department of Chemistry

Dr.M.Davamani Christober
Principal & Secretary

THE AMERICAN COLLEGE

AN AUTONOMOUS INSTITUTION AFFILIATED TO MADURAI KAMARAJ UNIVERSITY
Re-accredited (2nd Cycle) by NAAC with Grade A CGPA—3.46 on a 4-point scale
MADURAI—625002

Since 1881

A LABORATORY MANUAL

Proceedings of Practical Workshop - I on MOLECULAR TECHNIQUES IN LIFE SCIENCES

Organised by
American College Central Instrumentation Centre (ACCIC)

20th & 21st April 2021

loading...

A Laboratory Manual

Proceedings of the Practical Workshop – I on

Molecular Techniques in Life Sciences

20th & 21st, April 2021

Organised by

American College Central Instrumentation Centre (ACCIC)

The American College

Madurai - 625002

A Laboratory Manual – Proceedings of the Practical Workshop – I on Molecular Techniques in Life Sciences

Editor : **Editorial Board**

Language : **English**

First Edition : **April 2021**

Pages : **48**

Copies : **500**

Published by : **Kanthaga Pookkal Pathipagam**
New No. 120, Kuttiananjan Street
Sivakasi – 626 123, Tamil Nadu, India
Phone: +91-4562-277110
Cell: +91-9843577110
E-mail: sivakasi@gmail.com

Printed at : **Pushpam Printers**
4/1027, Hussain Colony
Near Kaliamman Temple
Sivakasi – 626 189
Cell: +91-9843144115

ISBN 978-93-80368-40-5

9 789380 368405

ISBN 978-93-80368-40-5

Editorial Board

ISBN 978-93-80368-40-5
9 789380 368405

கந்தகப்பூக்கள் வெளியீடு
இனி ஒரு விதி செய்வோம்

ISBN 978-93-80368-40-5