

**Department of ENERGY**  
**School of Chemical Sciences**  
**University of Madras**



<b>1</b>	<b>Name of the Department</b>	<b>ENERGY</b>
<b>2</b>	<b>Year of establishment</b>	1983
<b>3</b>	<b>Is the Department part of a School/Faculty of the university?</b>	Yes; School of Chemical Sciences
<b>4</b>	<b>Names of programmes offered (UG, PG, M.Phil., Ph.D., Integrated Masters; Integrated Ph.D., D.Sc., D.Litt., etc.)</b>	Ph.D.[Chemistry-Energy Interdisciplinary]& Ph.D.[Physics-Energy Interdisciplinary]
<b>5</b>	<b>Interdisciplinary programmes and departments involved</b>	NIL
<b>6</b>	<b>Courses in collaboration with other universities, industries, foreign institutions, etc.</b>	NIL
<b>7</b>	<b>Details of programmes discontinued, if any, with reasons</b>	NIL
<b>8</b>	<b>Examination System: Annual/Semester/Trimester/Choice Based Credit System</b>	Annual
<b>9</b>	<b>Participation of the department in the courses offered by other departments</b>	Offered a course namely "Industrial Nanotechnology" to M.Sc./M.Tech(NS& NT) students of National Centre for Nanoscience and Nanotechnology of the University.

**10. Number of teaching posts sanctioned, filled and actual (Professors/Associate Professors/Asst. Professors/others)**

	Sanctioned	Filled	Actual (including CAS & MPS)
Professor	1	1	1
Associate Professors	-	-	-
Asst. Professors	3	-	-
Others	-	-	-

**11. Faculty profile with name, qualification, designation, area of specialization, experience and research under guidance**

Name	Qualification	Designation	Specialization	No. of Years of Experience	No. of Ph.D./ M.Phil. students guided for the last 4 years
Dr. S. AUSTIN SUTHANTHIRARAJ	M.Sc., Ph.D	Professor & Head	Solid state ionics; Solid state batteries; Glassy electrolytes; Composite polymer electrolytes; Nanoionics; Dye-sensitized solar cells;	27	7

<b>12</b>	<b>List of senior Visiting Fellows, adjunct faculty, emeritus professors</b>	Dr. P. MARUTHAMUTHU CSIR Emeritus Scientist [Formerly HOD & Ex. Vice-Chancellor (Madurai Kamaraj University-Madurai)][2008-2011]		
<b>13</b>	<b>Percentage of classes taken by temporary faculty – programme-wise information</b>	NIL		
<b>14</b>	<b>Programme-wise Student Teacher Ratio</b>	Ph.D[Chemistry-Energy Interdisciplinary] = 5:1 Ph.D[Physics-Energy Interdisciplinary] = 5:1		
<b>15</b>	<b>Number of academic support staff (technical) and administrative staff:</b>			
	Sanctioned	Filled	Actual	
	1	-	-	
	1	1	1	

**16. Research thrust areas as recognized by major funding agencies**

- ✓ Heterogeneous Photo-catalysis
- ✓ Reaction Kinetics in Solutions
- ✓ Fast Reaction Kinetics
- ✓ Hydrogen Production in Visible Light Using Semiconductors
- ✓ Solar Photoactive Materials
- ✓ Dye-sensitized Solar Cells
- ✓ SolidState Ionics
- ✓ SolidState Power Devices
- ✓ Fast Ion Transport in Solids
- ✓ Glassy Electrolytes
- ✓ Polymer Electrolytes



**17. Number of faculty with ongoing projects from a) national b) international funding agencies and c) Total grants received. Give the names of the funding agencies, project title and grants received project-wise.**

S.No	Title of the Project	Name of the Principal Investigator	Funding Agency	Duration	Amount of Grant
1.	Design and characterization of zinc ion conducting nanocomposite gel electrolytes based on new polymer blends	Dr. S. Austin Suthanthiraraj	UGC	2011-2014	Rs.10.43 Lakhs
2.	Design and characterization of new zinc ion conducting nanocomposite gel polymer electrolytes	Dr. S. Austin Suthanthiraraj	NCNSNT	2011-2014	Rs.7.86 Lakhs

**18. Inter-institutional collaborative projects and associated grants received**

National collaboration -NIL

International collaboration – NIL

**19. Departmental projects funded by DST-FIST; UGC-SAP/CAS, DPE; DBT, ICSSR, AICTE, etc.; total grants received.**

S.No	Title of the Project	Name of the Principal Investigator	Funding Agency	Duration	Amount of Grant
1.	Synthesis and Characterization of new solid polymer electrolytes containing nanoscale fillers for ionic devices	Dr. S. Austin Suthanthiraraj	DST	2006-2009	Rs. 18.33 Lakhs
2.	Investigation on electrical and electrochemical characteristics of gel-type electrolyte membranes dispersed with some nanophase ceramics	Dr. S. Austin Suthanthiraraj	CSIR	2006-2009	Rs.11.97 Lakhs
3.	Design and development of nanocomposite polymer electrolytes for solid state energy devices	Dr. S. Austin Suthanthiraraj	U.G.C. [Under University with Potential for Excellence Programme]	2003-2008	Rs.4.5 Lakhs
4.	Design and characterization of zinc ion conducting nanocomposite gel electrolytes based on new polymer blends	Dr. S. Austin Suthanthiraraj	U.G.C.	2011-2014	Rs.10.43 Lakhs
5.	Design and characterization of new zinc ion conducting nanocomposite gel polymer electrolytes	Dr. S. Austin Suthanthiraraj	NCNSNT	2011-2014	Rs.7.86 Lakhs

**20. Research facility / centre with** -

- state recognition-**As Stated Below**
- national recognition -**As Stated Below**
- international recognition -**As Stated Below**

The existing research facilities of the Department include:

- Applied Photophysics Model Stopped – Flow Spectrophotometer
- Applied Photophysics Model UV and Visible Continuous Photolysis Setup
- Shimadzu UV-1601 Model UV Visible Spectrophotometer
- Photochemical Reaction Assembly
- BAS-100A Electrochemical Analyzer
- Hewlett-Packard Model HP4284A Precision LCR Meter
- High Temperature Furnaces
- Pelletizer
- Four Probe Conductivity Setup

**21. Special research laboratories sponsored by / created by industry or corporate bodies** -NIL

**22. Publications:**

- \* Number of papers published in peer reviewed journals (national / international) : 44
- \* Monographs : -
- \* Chapters in Books : -
- \* Edited Books : -
- \* Books with ISBN with details of publishers : -
- \* Number listed in International Database (For *e.g.* Web of Science, Scopus, Humanities International Complete, Dare Database - International Social Sciences Directory, EBSCO host, etc.) : -
- \* Citation Index – range / average : -
- \* SNIP : -
- \* SJR : -
- \* Impact Factor – range / average : -
- \* h-index

: -

### 23. Details of patents and income generated -

An Indian Patent entitled, “An improved solid – state polymer composition, a process for its preparation and an improved dye-sensitized solar cell” [Inventors: P. Maruthamuthu, B. Muthuraaman, S. Ganesan, S. Anandan, S. Murugesan, J. Madhavan, **S. Austin Suthanthiraraj**] has been filed [Vide Application No. 2728/CHE/2007 Dated 22-11-2007]

### 24. Areas of consultancy and income generated -

Areas of consultancy:

- i. Solid State Ionics-Fast ion conductors
- ii. SolidState Power Devices
- iii. Polymer Electrolytes
- iv. Solar Rechargeable Batteries
- v. SolidState Electrochemistry

Income generated: NIL

### 25. Faculty selected nationally / internationally to visit other laboratories / institutions / industries in India and abroad

Dr. S. Austin Suthanthiraraj, Professor and Head of the Department has visited National University of Singapore, Singapore as a member on the official delegation of University of Madras in order to discuss on Research Collaboration and Student/Staff Exchange between University of Madras and National University of Singapore from 17.9.2012 to 19.9.2012

### 26. Faculty serving in

National committees b) International committees c) Editorial Boards d) any other (please specify): **Prof. S. Austin Suthanthiraraj** has been serving as a Member of International Editorial Advisory Board for the International Journal of Chemistry, Environment and Technology(**IJCET**)

### 27. Faculty recharging strategies (UGC, ASC, Refresher / orientation programs, workshops, training programs and similar programs).

NIL

### 28. Student projects

- percentage of students who have done in-house projects including inter-departmental projects –NOT APPLICABLE
- percentage of students doing projects in collaboration with other universities / industry / institute – NOT APPLICABLE

**29. Awards / recognitions received at the national and international level by**

- Faculty –

<b>adt</b>	<b>Name &amp; Designation of the Faculty</b>	<b>Name of Award/Honour Received</b>	<b>Conferring Agency &amp; Month</b>
1.	PROF.S.AUSTIN SUTHANTHIRARAJ Professor and Head	Member-Syndicate University of Madras	University of Madras, Chennai, India <b>[2013]</b>
2.	PROF.S.AUSTIN SUTHANTHIRARAJ Professor and Head	Biographical Profile Nominated for Inclusion in “Great Minds of the 21 <sup>st</sup> Century”-6 <sup>th</sup> Edition	American Biographical Institute, North Carolina, USA <b>[2011]</b>
3.	PROF.S.AUSTIN SUTHANTHIRARAJ Professor and Head	Biographical Profile Nominated for “International Einstein Award for Scientific Achievement”	International Biographical Centre, Cambridge, UK <b>[2011]</b>
4.	PROF.S.AUSTIN SUTHANTHIRARAJ Professor and Head	Biographical Profile Nominated for Inclusion in “2000 Outstanding Intellectuals of the 21 <sup>st</sup> Century-2012”	International Biographical Centre, Cambridge, UK <b>[2011]</b>
5.	PROF.S.AUSTIN SUTHANTHIRARAJ Professor and Head	Nominated as International Scientist of the Year 2012	International Biographical Centre, Ely, UK <b>[2012]</b>
6.	PROF.S.AUSTIN SUTHANTHIRARAJ Professor and Head	Recipient of Academic Achievement Award 2012	University of Madras <b>[2012]</b>
7.	PROF.S.AUSTIN SUTHANTHIRARAJ Professor and Head	Nominated as International Advisory Board Member- International Journal of Chemistry, Environment and Technology [ISSN 2320 – 9712]	International Journal of Chemistry, Environment and Technology <b>[2012]</b>
8.	PROF.S.AUSTIN SUTHANTHIRARAJ Professor and Head	Mother Teresa Excellence Award	Integrated Council for Socio-Economic Progress- India <b>[2010]</b>
9.	PROF.S.AUSTIN SUTHANTHIRARAJ Professor and Head	Who’s Who in the World-28 <sup>th</sup> edition (Profile selected)	Marquis Who’s Who, NJ, USA <b>[2010]</b>
10.	PROF.S.AUSTIN SUTHANTHIRARAJ Professor and Head	Asia’s Who’s Who of Men & Women of Achievement	Rifacimento International- India <b>[2010]</b>

- ❖ Doctoral / post doctoral fellows  
 Mr. B. Joseph Paul has been awarded the CSIR SRF w.e.f.1-4-2009
- ❖ Mr. R.Kumar has been awarded the CSIR SRF w.e.f.1-4-2009
- ❖ Mr. M. Kumara Vadivel has been awarded the CSIR SRF w.e.f.1-4-2011
- ❖ Award of PDF to Mr. Joseph Paul in South Korea
- ❖ Award of PDF to Mr. R. Kumar in South Korea
- ❖ Award of INSPIRE Fellowship to Mrs. K.Sownthari for doing doctoral research
- Ms. S. Amudha has won second prize for the oral presentation in International Multi-disciplinary Conference on Solar Energy (IMDCSE-2012) held in Chennai from Feb.1-3, 2012



- Students - Not Applicable

**30. Seminars/ Conferences/Workshops organized and the source of funding (national / international) with details of outstanding participants, if any.**

**List of outstanding participants: (Details furnished in Appendix II)**

NIL

**31. Code of ethics for research followed by the departments -**

UGC regulations on minimum standard and procedure for the award of M.Phil/Ph.D. degree – 2009 are followed.

**32. Student profile programme-wise: NIL**

**33. Diversity of students**

Name of the Programme (refer to question no. 4)	% of students from the same university	% of students from other universities within the State	% of students from universities outside the State	% of students from other countries
Ph.D.[Chemistry-Energy Interdisciplinary]	100%	NIL	NIL	NIL
Ph.D.[Physics-Energy Interdisciplinary]	40%	60%	NIL	NIL



**34. How many students have cleared Civil Services and Defence Services examinations, NET, SET, GATE and other competitive examinations? Give details category-wise.**

ONE

**35. Student progression**

Student progression	Percentage against enrolled
UG to PG	NA
PG to M.Phil.	NA
PG to Ph.D.	NA
Ph.D. to Post-Doctoral	NA
Employed	
• Campus selection	NA
• Other than campus recruitment	100%
Entrepreneurs	NA

**36. Diversity of staff**

Percentage of faculty who are graduates	
of the same university	NIL
from other universities within the State	100%
from universities from other States	NIL
from universities outside the country	NIL

**37. Number of faculty who were awarded M.Phil., Ph.D., D.Sc. and D.Litt. during the assessment period**

NIL

**38. Present details of departmental infrastructural facilities with regard to**

- a) Library **-No. of Books = 563**
- b) Internet facilities for staff and students - **Available**
- c) Total number of class rooms - 1
- d) Class rooms with ICT facility - 1
- e) Students' laboratories -2
- f) Research laboratories -2

**39. List of doctoral, post-doctoral students and Research Associates : Enclosed**

a) from the host institution/university

S.No	Name	Research Supervisor
1.	Mr. V.S. Shankaran	Prof. S. Austin Suthanthiraraj
2.	Mrs. S. Sarojini	-do-
3.	Mr. M. Kumara Vadivel	-do-
4.	Mrs. R. Sarumathi	-do-
5.	Mrs. Ayesha Saleem	-do-
6.	Mrs. W. Lily Margaret Priya	-do-
7.	Miss. S. Amudha	-do-
8.	Mrs. K. Sowthari	-do-
9.	Mrs. A. Christina Nancy	-do-
10.	Mrs. M. Johnsi	-do-

b) from other institutions/universities

NIL

**40. Number of post graduate students getting financial assistance from the university. - NOT APPLICABLE**

**41. Was any need assessment exercise undertaken before the development of new programme(s)? If so, highlight the methodology.**

A new Post Graduate Degree Programme of the Department namely M.Sc (Energy and Materials Science) has already been instituted to be offered by the Department. It is intended to strengthen the above Programme with an enhanced intake of at least 20 students and start a new Post Graduate Diploma Course in Energy Sciences with an intake of 40 students during the 12<sup>th</sup> plan period.

**42. Does the department obtain feedback from**

**a. Faculty on curriculum as well as teaching-learning-evaluation? If yes, how does the department utilize the feedback?**

Yes. Feedback received from the faculties is placed before the Departmental Committee to revise the curriculum.

**b. Students on staff, curriculum and teaching-learning-evaluation and how does the department utilize the feedback?**

Students on staff – every academic year feedback is obtained by the IQAC and the findings are communicated to the faculty individually every year. The feedback is taken into account for confirmation/ promotion.

**c. Alumni and employers on the programmes offered and how does the department utilize the feedback?**

NIL

**43. List the distinguished alumni of the department (maximum 10)**

<b>S.No</b>	<b>Name</b>	<b>Year of Ph.D Awarded</b>	<b>Present Position</b>
1.	Dr. R. Renganathan	1985	Professor in Chemistry Bharathidasan University Tiruchirapalli
2.	Dr. P. Dharmalingam	1988	Reader Urumu Dhanalakshmi College Bharathidasan University Tiruchirapalli
3.	Dr. G. Manivannan	1988	Senior Manager Formulation Tech., STERIS Corporation MO, USA
4.	Dr. M. Ashok Kumar	1989	Associate Professor School of Chemistry University of Melbourne, Australia
5.	Dr. K. Gurunathan	1994	Professor & Head Department of Nanoscience & Nanotechnology Alagappa University Karaikudi
6.	Dr. M. Ravichandran	1999	Reader, Poompukar College, Bharathidasan University Mayiladuthurai
7.	Dr. A.C. Ganesh Kumar	2002	Assistant Professor Department of Physics Government Arts College Ponneri
8.	Dr. S. Anandan	2002	Associate Professor Department of Chemistry National Institute of Technology Tiruchirapalli
9.	Dr. P.R. Umarani	2004	Associate Professor & Head Department of Physics Presidency College Chennai
10.	Dr. R. Chitra Devi	2005	Selection Grade Lecturer Chellammal Women's College Chennai

**44. Give details of student enrichment programmes (special lectures / workshops /seminar) involving external experts.**

NIL

**45. List the teaching methods adopted by the faculty for different programmes.**

Seminars and Lectures assisted by ICT tools

**46. How does the department ensure that programme objectives are constantly met and learning outcomes are monitored?**

Laboratories outside the University and gain sufficient research experience in the fields of Solid State Ionics and Solar Energy Materials. They have presented their research findings in several National and International Conferences/Workshops held periodically both within and outside the country. Research scholars working in the Department have published their research outcome in reputed National and International Journals as well.

**47. Highlight the participation of students and faculty in extension activities.**

S.No	Name of the Programme	Place/Area of Activity	Target Group	No. of Beneficiaries	No. of Students involved in the Activity
1.	Extension of Laboratory Facilities and Expertise Guidance	Research Laboratory at Energy Department	M.Sc Degree Students of Affiliated Colleges	Three M.Sc (Chemistry) Students of GuruNanakCollege, Chennai-42	Three Ph.D Scholars of Energy Department
2.	Offering Technical Assistance in Utilization of Sophisticated scientific Instruments	Prof. GNR Instrumentation Centre, Maraimalai Campus, Chennai-25	PG Students and Ph.D Scholars of Various University Departments	Sixty PG Students and Ph.D Scholars of Various University Departments	Three Ph.D Scholars of Energy Department
3.	Extension of Laboratory Facilities and Expertise Guidance	Research Laboratory at Energy Department	M.Sc Degree Students of Rural Colleges	As and when Required upon Specific Requests	Full-Time Ph.D Scholars of Energy Department
4.	Extension of Laboratory Facilities and Expertise Guidance	Research Laboratory at Energy Department	Ph.D Scholars of SRM University and Karunya	Two Ph.D Scholars	Full-Time Ph.D Scholars of Energy Department

A group of eighteen students of M.Sc Degree Programme in Nanoscience and Nanotechnology accompanied by two faculty members from S.T Hindu College, Nagercoil (Affiliated to Manonmaniam Sundaranar University, Tirunelveli) have visited the Research Facilities /Laboratories of the Department of Energy during the period from Feb. 17-18, 2011 and interacted effectively with the faculty and the research scholars.

**48. Give details of “beyond syllabus scholarly activities” of the department.**

- i. Interactive linkages with premier technological institutions including IISc and IITs have already been initiated
- ii. Possible R&D collaboration with National University of Singapore, Singapore and Student/Staff Exchange programme have also been initiated

**49. State whether the programme/ department is accredited/ graded by other agencies? If yes, give details.**

Nil

**50. Briefly highlight the contributions of the department in generating newknowledge, basic or applied.**

The Department of Energy has participated in the formulation and execution of one of the most ambitious and prestigious programmes being undertaken by the University of Madras viz., UGC-funded Scheme of “University with Potential for Excellence” since 2003.

**51. Detail five major Strengths, Weaknesses, Opportunities and Challenges (SWOC) of the department.**

**Strengths:**

- i. Research expertise in Energy Device Materials
- ii. Laboratory facilities for synthesis of solid electrolytes
- iii. Analytical scientific instruments for characterization of new solid electrolyte materials
- iv. Library facilities

**Weaknesses:**

- i. Shortage of staff
- ii. Lack of consultancy

**Opportunities:**

- i. Scope for Energy Materials
- ii. Global recognition of Solar Energy-related Programmes
- iii. Availability of new, high-performance and advanced materials for batteries and fuel cells
- iv. Expansion of R&D activities in all areas of alternate energy sources
- v. Feasibility of R&D cooperation with National Laboratories

**Challenges:**

- i. Funding for innovative programmes
- ii. Training of manpower as a need-based endeavor
- iii. Global competition in Energy Materials
- iv. Identification of Energy Experts
- v. Large-scale operation from laboratory prototype modules

**52. Future plans of the department.**

It is planned to strengthen the already-instituted Post-Graduate Degree Programme of the Department namely M.Sc (Energy and Materials Science) with an intake of at least 20 students and to start yet another new Post-Graduate Diploma Course in Energy Sciences with an initial intake strength of 40 students. It is therefore intended to fill-up all the existing faculty positions of the Department in the near future. Considering the futuristic scope of several innovative Post-Graduate Programmes to be undertaken by the Department of Energy, establishment of necessary infra-structural facilities including provision of sufficient space of atleast 2400 sq.ft for accommodating both regular research-level and PG-level laboratories with modern equipment items as well as additional classrooms are of utmost priority of the Department. In addition, strengthening of existing Departmental Library for the benefit of all those Ph.D. scholars and future Post-Graduate-level students would also be taken up accordingly.