

# CURRICULUM VITAE



Dr. T. Siva, M.Sc., M.Phil., Ph.D.

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Assessor in Paint and Coatings (SCI)

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## Profile Summary

- 12+ years of experience in the ever-expanding areas of electrochemistry, corrosion science, and engineering, specialization in intelligent coatings, conducting polymer-based coatings, corrosion inhibitors, and corrosion monitoring.
- 31 international publications and seven book chapters in well-cited journals and publishers, and have been granted with 2 patents.
- Qualified assessor and trainer for the Paint and Coatings Skill Council of India - to handle paint and coatings related publications and practical assessments for skilled people.
- Received more than twelve national and international awards, including Fellowship's, NACE, AMPP and Berger Awards for research contributions.

## Areas of expertise

- Organic polymer synthesis using a chemical oxidative or electrochemical method and various dopants or inhibiting molecules.
- Systemic new chemical processes for the synthesis of smart and intelligent organic materials for protective coating system
- Suitable purification/separation method for synthesised smart pigments- Centrifugation, filtration process, qualitative and quantitative methods.
- Chemical analysis or structural analysis: FTIR, UV-Vis, XRD, XPS, TGA, SEM, TEM, particle size, Zeta potential measurements, BET, NMR, and ESR.
- Single or double pack systems of coatings by using epoxy, acrylic, urethane, silicone, and ceramic binders and chemical analysis of binders-epoxy equivalent and amine value.

## My key skills

- The scale up paint formulation with multiple pigments up to 5 litres for R & D purposes. Periodical analysis of liquid paint as per ASTM-D-1210, 1200, 1475, 1212, 5895, 2698, and 1353
- Selecting the suitable substrate for coatings (Mild steel/Aluminium-2024, A356/Magnesium-AZ91D alloys).
- The suitable surface preparation method before coating methods (using the picking method, wire brushing, and sand blasting method), and periodically measure the roughness of the substrate.
- Special metal pre-treatment for the substrate (using conversion coating (phosphate, chromate), anodization process

## CURRICULUM VITAE

- Suitable coating method in an economical way by using the air/airless/hot spray method, spin/dip coatings, brush methods
- Systematic analysis of physical tests for paint film (ASTM-D-7091, 3363, 3359, 4541, 522, 4060, 6905 & 523).
- The performance evaluation of coatings for long time analysis such as water vapour permeability (ASTM-D-1653), electrochemical impedance spectroscopy (EIS), salt spray test (ASTM-B-117), weathering test (ASTM-G-154), potential time measurement, polarization studies (ASTM-C-0876), immersion studies (Neutral, Base, Acid solutions) (ASTM-D-870), surface impedance mapping (SIM), Scanning Vibrating Electrode Technique (SVET).
- Determining and interpreting corrosion trends, as well as continuously reviewing corrosion monitoring and inspection strategies to ensure that they remain appropriate for the specific assigned R&D work.

### Academic Qualification

| Year | Degree in Chemistry  | University    | Class   |
|------|----------------------|---------------|---------|
| 2016 | Doctor of Philosophy | Bharathidasan | Awarded |
| 2009 | Master of Philosophy | Periyar       | First   |
| 2005 | Master of Science    | Bharathidasan | First   |
| 2003 | Bachelor of Science  | Bharathidasan | First   |

### Professional Experience

| Duration             | Institution                            | Position                                  | Activity |
|----------------------|--|---|----------|
| 05/04/23 - Till date | CIPET-ARSTPS                           | Senior Research Associate(Pool Scientist) | R&D      |
| 21/01/21 - 03/10/22  | CIPET-LARPM                            | N-Postdoctoral Fellow                     | R&D      |
| 03/04/17 - 30/04/20  | CSIR-CECRI                             | Research Associate                        | R&D      |
| 11/03/14 - 09/12/16  | CSIR-CECRI                             | Senior Project Fellow                     | R&D      |
| 23/03/13 - 10/03/14  | CSIR-CECRI                             | Research Intern                           | R&D      |
| 08/06/12 - 02/11/12  | CSIR-CECRI                             | Senior Project Assistant                  | R&D      |
| 21/05/10 - 30/03/12  | CSIR-CECRI                             | Project Fellow                            | R&D      |
| 09/07/08 - 21/05/10  | Vetri Vikass Institute                 | PG Assistant                              | Teaching |
| 08/09/05 - 07/04/06  | Sri Raghavendra Arts & Science College | Lecturer                                  | Teaching |

### Research Highlights

#### Smart and self-healing Coatings

- Organic coatings are the established and economical way of protecting metallic infrastructures against corrosion. It offers corrosion protection by means of barrier effects. Mechanical damage or pinholes in the coating promote accelerated corrosion due to the large anode and small cathode configuration.
- Smart coatings, which can respond and heal on their own, are urgently needed to extend the life of infrastructures.

## CURRICULUM VITAE

- Environmental friendliness and the use of carcinogenic chromates have necessitated the development of eco-friendly smart coatings. The following are some of the smart coatings that have been developed by me.

### **Polymer based Smart Coatings**

- Developed nano-structural polymer-based smart coatings that can be fabricated through chemical oxidative polymerization. Before, to initiate the micro emulsion polymerization by using suitable surfactants, oxidants, and templates.
- Paints formulated with intrinsically conducting polymers (ICP) /nano-structural conducting polymer as one of the pigments.
- These ICPs prevent pinhole corrosion by passivation of the substrate due to its redox activity. While undergoing a redox transition, it also releases dopant ions.
- ICPs with corrosion inhibitive ions (phosphate, phosphonate, oxalate, benzoate, sulfonate, tungstate, molybdate) as dopants were successfully developed and smart coatings with these ICPs formulated.
- The performance evaluations of these paints were carried out by all conventional ASTM techniques and compared with conventional paints.
- The smartness of the coating was evaluated by the scanning vibrating electrode technique (SVET) and insitu-FTIR.
- The timely release of inhibitive ions at local corrosion sites reinforces corrosion protection. A suitable mechanism is suggested.

### **Reservoir based Smart Coatings**

- The nano-structured intelligent reservoirs were synthesised through the modified Stober method, hydrothermal, and sol-gel methods and were used to load corrosion inhibitor molecules and covered with pH-sensing layers.
- PH-sensitive mesoporous reservoirs loaded with corrosion inhibitors were synthesized, and smart coatings with conventional binders were formulated.
- A reservoir entrapped in the primer coating ensures the release of corrosion inhibitors based on the need.
- The on-set of corrosion activity in the nearby area due to the local change in pH arrests the corrosion process.
- In-situ FTIR and SVET were used to investigate the smartness of the coating by determining the release of inhibitor at the site.

### **Microcapsules based Smart Coatings**

- Microcapsules have been synthesised by the in situ emulsion (Oil/Water) polymerization method.
- The microcapsules encapsulating the corrosion inhibitors were synthesised and the paint formulated with conventional binders.
- When there is mechanical damage, the capsules present in the primer coat will break and release the encapsulated inhibitor, arresting corrosion in the mechanically damaged area.

## CURRICULUM VITAE

### **Inhibitor Decorated Pigment based Smart Coatings**

- The layer-by-layer method (LBL) with appropriate inhibitors and pH-sensing layers is used to create an inhibitor-decorated pigments-based system.
- Commercial pigments like mica, TiO<sub>2</sub> were surface functionalized in such a way to carry corrosion inhibitor with polyelectrolyte multi layers or conducting polymers doped with corrosion inhibitive ions and hence ensure the release of respective inhibitors when corrosion initiates.
- These pigments were incorporated into paint formulations for primer coatings over steel and aluminium alloys and were successfully demonstrated.
- This cost-effective smart coating performs nearly 3 orders of magnitude better than conventional primer coating formulations.

### **Electropolymerized Primer Layers for Corrosion Protection**

- Electropolymerization of polymers or polymer composites over steel and aluminium alloys was also established by various techniques (including the Cyclic Voltammetry method) and their corrosion protection performance was evaluated by polarisation and impedance methods.
- This research on smart coatings for corrosion control led to a number of international publications with good citations.

### **Awards & Recognitions**

1. AMPP (Association for Materials Protection and Performance) India Chapter (AIC) Award for Excellence in Distinction in Corrosion Science & Technology in Industrial Organization at CORCON-2024, Chennai on 21<sup>st</sup> November 2024.
2. Best Poster Award at 20<sup>th</sup> National Congress on Corrosion Control, organized by NCCI at Coimbatore, during 7-9 December 2023.
3. CSIR-Senior Research Associate Fellowship (Scientist's Pool Scheme) (2022-2023) at Delhi.
4. AWSAR - Best Science Story Award 2022 in PDF category organized by Department of Science and Technology (DST) at Delhi, 28, February 2023.
5. SERB - National Postdoctoral Fellowship (N-PDF) (2020-2021) at CIPET, Bhubaneswar.
6. Best Thesis Award-2018 at Nineteenth National congress on corrosion control organized by NCCI, at Bhubaneswar, 5-7 December 2018.
7. NACE (NIGIS) Corrosion Awareness Award-2017 for PhD student at CORCON-17, Mumbai, on 19<sup>th</sup> September 2017.
8. Berger Award for Excellence in Coatings Research at 13<sup>th</sup> Surface Engineering & Paint Coatings Expo-2017, organized by SSPC, at Pune, during 15-17 February 2017.
9. CSIR-Research Associate Fellowship (2016-2017) at Delhi.
10. Best Paper Award at National Corrosion day organized by NCCI, at Kalasalingam University, Krishnankoil, on 8 April 2016.
11. Best Poster Award at 18<sup>th</sup> National Congress on Corrosion Control, organized by NCCI at Chennai, during 24-26 February 2016.

## CURRICULUM VITAE

12. Best Paper Award at National Corrosion day, organized by NCCI, at Gandhigram University, Dindigul, on 17 April 2015.
13. Best Poster Award at 16<sup>th</sup> National Congress on Corrosion Control, organized by NCCI at Kolkata, during 23-25 August 2012.

### Patents

1. **\*T. Siva**, S. Sathiyarayanan, S. Syed Azim "Sustained Release Reservoir based Smart Anticorrosive Coating and its process thereof", Indian patent, Patent No: 375021, Application No: 201611018924, Date of Filing: 02/06/2016, Date of Published: 11/03/2021, Date of Grant: 23/08/2021.
2. **\*T. Siva**, S. Sathiyarayanan, S. Syed Azim "Inhibitor Decorated Pigment based Smart Anticorrosive Coating and its process thereof" Indian patent, Patent No: 370860, Application No: 201711001421, Date of Filing: 13/01/2017, Date of Published: 22/01/2021, Date of Grant: 30/06/2021.

### Technology Transfer

1. **\*T. Siva**, S. Sathiyarayanan, S. Syed Azim, Sustained Release Reservoir (SRR) based Smart Anticorrosive Coatings, (2016), Indian patent, Patent No: 375021, Application No: 201611018924, Date of Filing: 02/06/2016, Date of Published: 11/03/2021, Date of Grant: 23/08/2021.

### Project Detail

1. Title of the project: "Development of Corrosion Resistant and Anti-Fouling Based Smart Zeolite Coatings for Marine Vehicles"; Project File No: PDF/2020/001818; Principal Investigator(s) and Co-Investigator(s): **T. Siva** & R. Ananthakumar; Funding Agency: SERB; Budget: Rs. 21,31,200.00; Duration: 24 Months; Date of commencement: 20/01/2021; Date of completion: 19/01/2023.

### Papers Published in Journals

1. **\*T. Siva**, R. Ananthakumar, B. Saravanakumar, Dual templated-based synthesis of smart zeolites and its self-healing anticorrosion coatings, Journal of European Polymer 210 (2024) 112957, <https://doi.org/10.1016/j.eurpolymj.2024.112957>. (I.F: 6.0) (Q1).
2. K. Suruthi, S. Arunkumar, H. Tanaya Das, T. Arun, **T. Siva**, R. Krishna Pai, R. Ananthakumar, Prospects into the Role of Nanoporous Electrodes for Supercapacitors: Insight into Their Structure and Performance, Energy Fuels 38 (2024) 18116–18152, <https://doi.org/10.1021/acs.energyfuels.4c01220> (I.F: 5.2) (Q2).
3. B. Saravanakumar, K. Thiyagarajan, S. K. Balasingam, **T. Siva**, R. Krishna Pai, R. Ananthakumar, Recent advances and innovations in the piezoelectrochemical process for energy and the environment: A review, Journal of Energy Storage 83 (2024) 110576, <https://doi.org/10.1016/j.est.2024.110576>. (I.F: 9.4) (Q2).
4. **\*T. Siva**, K. Kamaraj, V. Karpakam, S. Sathiyarayanan, R. Ananthakumar, Electrosynthesis of Silica Reservoir Incorporated Dual Stimuli Responsive

## CURRICULUM VITAE

- Conducting Polymer-based Self-healing Coatings, Industrial & Engineering Chemistry Research, 62 (2023) 3942–3951. <https://doi.org/10.1021/acs.iecr.2c03445>. (I.F: 4.2) (Q1).
5. **\*T. Siva**, P. Thirumurugan, P. Jeyanthi, R. Ananthakumar, Synthesis and Characterization of Poly (aniline-co-p-nitroaniline) (PANA) and its Corrosion-resistant Properties against Corrosive Media, Results in Surfaces and interfaces 8 (2022) 100069. <https://doi.org/10.1016/j.rsufi.2022.100069>. (I.F:1.9) (Q1).
  6. A. Gautam, **T. Siva**, S. Sathiyarayanan, K. V. Gobi, R. Subasri, Capped inhibitor-loaded halloysite nanoclay-based self-healing silica coatings for corrosion protection of mild steel, Ceramics International, 48 (2022) 30151-30163. <https://doi.org/10.1016/j.ceramint.2022.06.288>. (I.F: 5.2) (Q1).
  7. D. Thirumoolan, K. Anver Basha, S.P. Sakthinathan, **T. Siva**, Corrosion protection properties of poly((benzoyl phenyl) methacrylate-co-methoxy ethylmethacrylate) coating on mild steel, Journal of Molecular Structure, 1264 (2022) 133186 <https://doi.org/10.1016/j.molstruc.2022.133186>. (I.F: 3.8) (Q2).
  8. K. Gopi, **T. Siva**, R. Ananthakumar, Surface Functionalized Bio ceramics Coated on Metallic Implants for Biomedical and Anticorrosion Performance - A Review, Journal of Materials Chemistry B, 9 (2021) 9433-9460. <https://doi.org/10.1039/D1TB01301G>. (I.F: 7.0) (Q1).
  9. **\*T. Siva**, R. Ananthakumar, S. Sathiyarayanan, Emerging Action of Corrosion Prevention Based on Sustained Self-healing Coatings, Surfaces and Interfaces, 26 (2021) 101440(1-12). <https://doi.org/10.1016/j.surfin.2021.101440>. (I.F: 6.2) (Q1).
  10. **\*T. Siva**, S.S. Sreejakumari, S. Sathiyarayanan, Dendrimer like Mesoporous Silica Nano container (DMSN) Based Smart Self-Healing Coating for Corrosion Protection performance, Progress in Organic Coatings 154 (2021) 106201(1-9). <https://doi.org/10.1016/j.porgcoat.2021.106201>. (I.F: 6.6) (Q1).
  11. R. Jeyaram, A. Elango, **T. Siva**, A. Ayeshamariam, K. Kaviyarasu, Corrosion protection of silane based coatings on mild steel in an aggressive chloride ion environment, Surfaces and Interfaces, 18 (2020) 100423-32. <https://doi.org/10.1016/j.surfin.2019.100423>. (I.F: 6.2) (Q1).
  12. **\*T. Siva**, T. Bharathidasan, S. Sathiyarayanan Anionic surfactant doped synthesis of Poly Aniline Dendritic (PANID) fibers and its anti-corrosion performance, Materials Today Communications, 23 (2020) 100812-22. <https://doi.org/10.1016/j.mtcomm.2019.100812>. (I.F: 3.8) (Q2).
  13. **\*T. Siva**, S. Rajkumar, S. Muralidharan, S. Sathiyarayanan, Bipolar Properties of Coatings to Enhance the Corrosion Protection Performance, Progress in Organic Coatings 137 (2019) 105379-86. <https://doi.org/10.1016/j.porgcoat.2019.105379>. (I.F: 6.6) (Q1).
  14. S.H. Adsul, **T. Siva**, S. Sathiyarayanan, S.H. Sonawane, R. Subasri, Aluminum pillared montmorillonite clay-based self-healing coatings for corrosion protection of magnesium alloy AZ91D, Surface and Coatings



## CURRICULUM VITAE

- Technology, 352 (2018) 445-461. <https://doi.org/10.1016/j.surfcoat.2018.08.034>. (I.F: 5.4) (Q1).
15. S. Manasa, **T. Siva**, S. Sathiyarayanan, K.V. Gobi, R. Subasri, Montmorillonite Nanoclay-based Self- Healing Coatings on AA 2024-T4, Journal of Coatings Technology and Research (JCTR) 15 (2018) 721-735. <https://doi.org/10.1007/s11998-018-0080-5>. (I.F: 2.3) (Q2).
  16. D. Thirumoolan, **T. Siva**, S. Sathiyarayanan, K. Anver Basha, K. Kaviyarasu, A. Ayeshamarium, M. Jayachandran, Study on Anticorrosion Behaviour Poly (N-vinylimidazole-co-methoxyethyl methacrylate) Based Coating in the Aggressive Chloride Ion Environment, Journal of Advanced Microscopy Research 13 (2018) 1-13. <https://doi.org/10.1166/jamr.2018.1353>. (I.F: 0.00) (Q4).
  17. S. Manasa, A. Jyothirmayi, **T. Siva**, M. Ramakrishna, S. Sathiyarayanan, R. Subasri, Nanoclay-based Self-Healing, Corrosion Protection Coatings on Aluminum, A356.0 and AZ91 Substrates, Journal of Coatings Technology and Research (JCTR) 14 (2017) 1195–1208. <https://doi.org/10.1007/s11998-016-9912-3>. (I.F: 2.3) (Q2).
  18. S. Manasa, A. Jyothirmayi, **T. Siva**, S. Sathiyarayanan, K.V. Gobi, R. Subasri, Effect of Inhibitor Loading into Nanocontainer Additives of Self-healing Corrosion Protection Coatings on Aluminum alloy A356.0, Journal of Alloys and Compounds 726 (2017) 969-977. <https://doi.org/10.1016/j.jallcom.2017.08.037>. (I.F: 6.2) (Q1).
  19. **\*T. Siva**, S. Muralidharan, S. Sathiyarayanan, E. Manikandan, M. Jayachandran, Enhanced Polymer Induced Precipitation of Polymorphous in Calcium Carbonate: Calcite Aragonite Vaterite Phases, Journal of Inorganic and Organometallic Polymers and Materials 27 (2017) 1-9. <https://doi.org/10.1007/s10904-017-0520-1>. (I.F: 4.0) (Q1).
  20. S.H. Adsul, **T. Siva**, S. Sathiyarayanan, S.H. Sonawane, R. Subasri, Self-healing ability of nanoclay-based hybrid sol-gel coatings on magnesium alloy AZ91D, Surface and Coatings Technology, 309 (2017) 609–620. <https://doi.org/10.1016/j.surfcoat.2016.12.018>. (I.F: 5.4) (Q1).
  21. **\*T. Siva**, S. Sathiyarayanan, Cationic surfactant assisted of poly o-methoxy aniline (PoMA) hollow sphere and its self-healing performance RSC Advance 6 (2016) 2944-2950. <https://doi.org/10.1039/C5RA23090J>. (I.F: 3.9) (Q1).
  22. J. Yamuna, **T. Siva**, S.S. Sreejakumari, S. Sathiyarayanan, Smart Poly (aniline formaldehyde) Microcapsules Based Self-healing anticorrosive Coating, RSC Advance 6 (2016) 79-86. <https://doi.org/10.1039/C5RA19524A>. (I.F: 3.9) (Q1).
  23. D. Thirumoolan, **T. Siva**, K. Vetrivel, S. Sathiyarayanan, K. Anver Basha, Corrosion resistant performance of hydrophobic poly (N-vinylimidazole-co-ethyl methacrylate) coating on mild steel, Progress in Organic Coatings 89 (2015) 181–191. <https://doi.org/10.1016/j.porgcoat.2015.09.014>. (I.F: 6.6) (Q1).

## CURRICULUM VITAE

24. **\*T. Siva**, M. Sunder, S.S. Sreejakumari, S. Sathiyarayanan, Mesoporous silica based reservoir for active protection of mild steel in aggressive chloride ion environment, RSC Advance 5 (2015) 39278-39284. <https://doi.org/10.1039/C5RA04670J>. (I.F: 3.9) (Q1).
25. K. Kamaraj, Rajani Devarapalli, **T. Siva**, S. Sathiyarayanan, Self-healing electrosynthesised polyaniline film as primer coat for AA 2024-T3, Journal of Materials Chemistry and Physics 153 (2015) 256–265. <https://doi.org/10.1016/j.matchemphys.2015.01.012>. (I.F: 4.6) (Q1).
26. **\*T. Siva**, S. Sathiyarayanan, Self-healing coatings containing dual active agent loaded urea formaldehyde (UF) microcapsules, Progress in Organic Coatings 82 (2015) 57-67. <https://doi.org/10.1016/j.porgcoat.2015.01.010>. (I.F: 6.6) (Q1).
27. **\*T. Siva**, K. Kamaraj, S. Sathiyarayanan, Epoxy curing by polyaniline (PANI)–Characterization and self-healing evaluation, Progress in Organic Coatings 77 (2014) 1095–1103. <https://doi.org/10.1016/j.porgcoat.2014.03.019>. (I.F: 6.6) (Q1).
28. **\*T. Siva**, K. Kamaraj, S. Sathiyarayanan, Electrosynthesis of poly (aniline-co-o-phenylenediamine) film on steel and its corrosion protection performance, Progress in Organic Coatings 77(2014) 1807-1815. <https://doi.org/10.1016/j.porgcoat.2014.06.003>. (I.F: 6.6) (Q1).
29. M. Sunder, **T. Siva**, S. Sathiyarayanan, Graphene ink as a corrosion inhibiting blanket for iron in an aggressive chloride environment, RSC advance 3(2013) 24868-24871. <https://doi.org/10.1039/C3RA43931C>. (I.F: 3.9) (Q1).
30. **\*T. Siva**, K. Kamaraj, V. Karpakam, S. Sathiyarayanan, Soft template synthesis of poly (o-phenylenediamine) nanotubes and its application in self-healing coatings, Progress in Organic Coatings 76 (2013) 581– 588. <https://doi.org/10.1016/j.porgcoat.2012.11.009>. (I.F: 6.6) (Q1).
31. K. Kamaraj, **T. Siva**, G. Venkatachari, S. Muthukrishnan, S. Sathiyarayanan, Synthesis of oxalate doped polyaniline and its corrosion protection performance, Journal of Solid State Electrochemistry 16 (2012) 465-471. <https://doi.org/10.1007/s10008-011-1354-3>. (I.F: 2.5) (Q2).

### Proceedings

1. Synthesis of Poly o-phenylenediamine Nanocapsules Using  $\beta$ -Cyclodextrin and its anticorrosion performance, **\*T. Siva**, S. Sathiyarayanan, published at CORCON-2011, Paper no: PCP-12 (East Asia & Pacific Area Corrosion Conference Expo), 28-30 Sept. 2011, Mumbai.

### Book Chapter

1. **T. Siva**, R. Ananthakumar, Nanomaterials Coatings on Textiles Structure for Antibacterial and Antiviral Applications, Antibacterial and Antiviral Functional Materials Volume-2, ACS Symposium Series; American Chemical Society, 1472 (2024) 329-359, DOI: [10.1021/bk-2024-1472.ch011](https://doi.org/10.1021/bk-2024-1472.ch011), ISBN: 9780841297043 (eBook).



## CURRICULUM VITAE

2. **T. Siva**, R. Ananthakumar, Hexagonal Boron Nitride Based Antifriction and Anticorrosive Coating, Hexagonal Boron Nitride-Synthesis, Properties and Applications, Elsevier (2024), 295-319, DOI: <https://doi.org/10.1016/B978-0-443-18843-5.00011-2>, ISBN: 9780443188435 (Print), ISBN: 9780443188428 (eBook).
3. D. Thirumoolan, **T. Siva**, R. Ananthakumar, K. S. Nathiga Nambi, Alginate-Based Superabsorbents, Bio-based Superabsorbents, Engineering Materials, Springer Nature (2023), 93-114, DOI: [https://doi.org/10.1007/978-981-99-3094-4\\_6](https://doi.org/10.1007/978-981-99-3094-4_6), ISBN: 978-981-99-3093-7(Print), ISBN: 978-981-99-3094-4 (eBook).
4. K. Siruthi, T. Alekhika, **T. Siva**, R. Ananthakumar, Flexoelectricity in nanogenerator ceramics, Flexoelectricity in Ceramics and their Application, Elsevier (2023), 129-155, DOI: <https://doi.org/10.1016/B978-0-323-95270-5.00001-6>, ISBN: 978-0-323-95270-5 (Print).
5. **\*T. Siva**, T. Alekhika, R. Ananthakumar, Fluoropolymer nanocomposites for superhydrophobic antireflective and anticorrosive coatings, Advanced Fluoropolymer Nanocomposites: Fabrication, Processing, Characterizations and Applications, Woodhead Publisher (2023), 681-718, DOI: <https://doi.org/10.1016/B978-0-323-95335-1.00013-X>, ISBN: 978-0-323-95335-1(Print).
6. **\*T. Siva**, T. Alekhika, R. Ananthakumar, Impact of environmental conditions on the tribological performance of polymeric composites, Tribology of Polymers, Polymer Composites, and Polymer Nanocomposites, Elsevier (2022) 437-446, DOI: <https://doi.org/10.1016/B978-0-323-90748-4.00006-6>, ISBN: 978-0-323-90748-4 (Print).
7. **\*T. Siva**, P. Jeyanthi, P. Thirumurugan, S. Sathiyarayanan, A. Ayeshamariam, M. Jayachandran, Determining the Template-Based Synthesis of Silica (SiO<sub>2</sub>-r) Rods and Its Corrosion Protection Performance, Newest Updates in Physical Science Research 10 (2021) 59-73, B P International Publisher (International Book) UK. DOI: <https://doi.org/10.9734/bpi/nupsr/v10/2572F>. ISBN 978-93-91473-48-8 (Print); ISBN 978-93-91473-56-3 (eBook).

### Skill Development /Trainings conducted

1. Refresher course on Paints for corrosion protection by CECRI, at Karaikudi on 26-30 August 2019.
2. Skill Development training program on Assistant Decorative painter by RTC & CECRI, at Amravathiputhur & Karaikudi on 27 February- 29 March 2019.
3. Refresher course on Paints for corrosion protection by CECRI, at Karaikudi on 16-20 November 2018.
4. Assessment of Trainees under Prior Learning Scheme for paint and coatings by paint and coatings skill council, at JKR manpower services, Thanjavur on 12 September 2018.

## CURRICULUM VITAE

5. Assessment of Trainees under Prior Learning Scheme for paint and coatings by paint and coatings skill council, at JKR manpower services, Thanjavur on 10 August 2018.
6. Skill Development training program on Protective marine painter by PLPC & CECRI, at Kuthenkuli & Karaikudi on 2 - 25 May 2018.
7. Assessment of Trainees under Prior Learning Scheme for paint and coatings by paint and coatings skill council, at JKR manpower services, Thanjavur on 28 March 2018.
8. Skill Development training program on Paints and coatings for corrosion protection by RTC & CECRI, at Amravathiputhur & Karaikudi on 5- 27 December 2017.
9. Refresher course on Paints for corrosion protection by CECRI, at Karaikudi on 18-22 November 2017.
10. Skill Development training program on Protective marine painter by CECRI, at Mandapam unit on 30 May - 29 June 2017.
11. Skill Development training program on Paints and coatings for the prevention of corrosion and fouling on the sea going vessels of fisherman by CECRI, at Mandapam unit on 15-30 May 2017.
12. Tailor made training program on Paints and coatings for corrosion protection by CECRI, at Karaikudi on 6-11 March 2017.
13. Refresher course on Paints for corrosion protection by CECRI, at Karaikudi on 7-11 November 2016.
14. Refresher course on Paints for corrosion protection by CECRI, at Karaikudi on 16-20 November 2015.

### Papers Presented in Symposium/Conferences/Congress

1. Dual templated-based synthesis of smart zeolites and its anticorrosion coatings, **\*T. Siva**, B. Saravanakumar, R. Ananthakumar, Twentieth National Congress on Corrosion Control, organized by NCCI, during 7-9 December 2023 at Coimbatore.
2. Electropolymerised conducting polymer based smart coatings, **\*T. Siva**, R. Ananthakumar, S. Sathiyarayanan, Twelfth International (virtual) Conference on Advancement in Polymeric Materials (APM-2021) organized by CIPET-LARPM, during 9-13 March, 2021 at Bhubaneswar.
3. Ceria nanocontainer based smart coatings for anticorrosion performance, **\*T. Siva**, K. Viji, S. Abirami, S. Sathiyarayanan, Nineteenth National congress on corrosion control organized by NCCI, during 5-7 December, 2018 at Bhubaneswar.
4. Sustained release reservoir based smart coating for corrosion protection performance, **\*T. Siva**, K. Viji, R. Jeyaram, S. Muralidharan, S. Sathiyarayanan, Eleventh International Symposium on Advances in Electrochemical Science and Technology (ISAEST-11) organized by SAEST, during 7-10 December, 2016 at Chennai.

## CURRICULUM VITAE

5. A Novel silica based self-healing coating with sustained release of dopant ion, **\*T. Siva**, V. Saranyan, S.S. Sreejakumari, S. Syed Azim, S. Sathiyarayanan, Nineteenth National Convention of Electrochemists (NCE-19) Organized by SAEST, during 28-29 March, 2016 at Tiruchirappalli.
6. TiO<sub>2</sub> reservoir based self-healing coatings for corrosion protection, **\*T. Siva**, V. Saranyan, S.S. Sreejakumari, K. Viji, S. Sathiyarayanan, Eighteenth National congress on corrosion control organized by NCCI & CSIR-CECRI, during 24-26 February, 2016 at Chennai.
7. Electrosynthesis of nano reservoir incorporated conducting polymer based self-healing coatings, **\*T. Siva**, S. Sathiyarayanan, Seventeenth National congress on corrosion control organized by NCCI, CSIR-CECRI, during 21-23 August, 2014 at Karaikudi.
8. Electropolymerised self-healing coatings, **\*T. Siva**, S. Sathiyarayanan, National Symposium on Polymer and Coatings (NSPC-2014) organized by CSIR-IICT, during 25-26 April, 2014 at Hyderabad.
9. Smart self-healing coating containing porous silica loaded with eco-friendly corrosion inhibitor, **\*T. Siva**, K. Kamaraj, S. Muralidharan, S. Sathiyarayanan, Tenth International Symposium on Advances in Electrochemical Science and Technology (ISAEST-10) organized by SAEST, during 28-30 January, 2013 at Chennai.
10. The Effect of Poly (Ethylene glycol) on diverse morphology of CaCO<sub>3</sub> scale formation, **\*T. Siva**, S. Muralidharan, K. Kamaraj, S. Sathiyarayanan, Seventeenth National Convention of Electrochemists (NCE-17), Organized by SAEST, during 14-15 September, 2012 at Chennai.
11. Synthesis and characterization of urea formaldehyde microcapsules containing dual active agent loaded self-healing coatings, **\*T. Siva**, K. Kamaraj, V. Karpakam, S. Sathiyarayanan, Sixteenth National Congress on Corrosion Control organized by NCCI, during 23-25 August, 2012 at Kolkata.
12. Electrodeposition of polyaniline, poly (2-ethylaniline), and poly (aniline-co-2-ethylaniline) on steel surfaces and their corrosion protection performance, V. Karpakam, K. Kamaraj, **T. Siva**, S. Sathiyarayanan, Presented at the Conference on Engineering coatings ENGCOAT-2012 Organized by IIT Mumbai during Feb 9-11, 2012 at Mumbai.
13. Electrodeposited PANI-nanoSiO<sub>2</sub> composite coatings on AA 2024-T3 and its corrosion protection performance, K. Kamaraj, V. Karpakam, **T. Siva**, S. Sathiyarayanan Presented at the Conference on Engineering coatings ENGCOAT-2012 Organized by IIT Mumbai during Feb 9-11, 2012 at Mumbai.
14. Template-free synthesis of hollow sphere of conducting-polymer and its anticorrosion performance, **\*T. Siva**, K. Kamaraj, V. Karpakam, S. Sathiyarayanan, Presented at the Conference on Engineering coatings ENGCOAT-2012 Organized by IIT Mumbai during Feb 9-11, 2012 at Mumbai.

## CURRICULUM VITAE

15. Self-healing hardener free coating containing PANI, **\*T. Siva**, K. Kamaraj, V. Karpakam, S. Sathiyarayanan, Presented at the International Symposium on surface Protective Coatings during 7- 9 Dec 2011at Bangalore.
16. Corrosion Protection Performance of PANI Nano Fibers, V. Karpakam, K. Kamaraj, **T. Siva**, S. Sathiyarayanan, Presented at the International Symposium on surface Protective Coatings during 7- 9 Dec 2011 at Bangalore.
17. Synthesis of Poly o-phenylenediamine Nanocapsules Using  $\beta$ -Cyclodextrin and its anticorrosion performance, **\*T. Siva**, S. Sathiyarayanan, Presented at CORCON2011, during 28-30 Sept. 2011 at Mumbai.
18. Chemical polymerization of poly (p-nitro aniline-co-aniline) and its Corrosion protection performance, **\*T. Siva**, V. Karpakam, K. Kamaraj, S. Syedazim, S. Sathiyarayanan, G. Venkatachari, Presented at the International Symposium on Advances in Electrochemical Science & Technology (iSAEST-9), Organised by SAEST, during December 2-4, 2010held at Hotel Green Park, Chennai.
19. Electrosynthesis of poly (aniline-co-o-phenylenediamine) film on steel and Its corrosion protection performance, **\*T. Siva**, V. Karpakam, K. Kamaraj, S. Sathiyarayanan, G. Venkatachari, Presented at the Fifteenth National Congress on Corrosion Control organized by NCCI during 16 – 18 September, 2010 at the Accord Metropolitan, Chennai.

### Industry Oriented Courses / Workshops Attended

1. Online course on The Digital Educator: A Primer by UNESCO MGIEP (Mahatma Gandhi Institute of Education for Peace and Sustainable Development), New Delhi on 21<sup>th</sup> March, 2024.
2. One day AWSAR (Augmenting Writing Skills for Articulating Research) Training workshop on Popular Science Writing by Ranchi university, Morabadi, Ranchi. 13<sup>th</sup> July, 2022.
3. National Workshop on Nanomechanical and Tribological characterization of Materials organized by Centre for Nanoscience and Nanotechnology, Sathyabama Institute of Science and Technology, Chennai during 4-5<sup>th</sup>, March, 2022.
4. Two Weeks International Faculty Development Programme (FDP) on Advanced Computational and Experimental Research in Physics-2021 organized by SRM Institute of Science and Technology Ramapuram Campus, Chennai during 13-25<sup>th</sup>, September, 2021.
5. One Week Faculty Development Programme (FDP) on Applied Chemistry: A Catalyst for Scientific Transformations organized by Shree Guru Gobind Singh Tricentenary (SGT) University, Gurugram, Delhi during 23-28<sup>th</sup>, August, 2021.
6. Two Weeks International Workshop on Emerging Trends in the field of Science and Technology organized by Sathyabama Institute of Science and Technology, Chennai during 16-28<sup>th</sup>, August, 2021.
7. One week virtual faculty development programme on Synthesis, Characterization and Applications of Novel Materials by Ramco Institute of Technology, at Rajapalayam, Tamilnadu, on 2-6 August, 2021.

## CURRICULUM VITAE

8. Online two days' workshop on Tools for Exploring Chemistry by Rajdhani College (University of Delhi) at Delhi on 12-13 July 2021.
9. Two days National virtual workshop on big data analytics in cloud computing using python programming by Annamalai university, at Tamilnadu, 9-10 July, 2021.
10. One day pre-conference Training Workshop on Fundamentals and application of Electrochemical Impedance Spectroscopy by Twelfth International Symposium on Advances in Electrochemical Science and Technology (ISAEST-12) organized by SAEST, at Chennai, 7-10 January, 2019.
11. Assessor / Trainer course on Marine Painter conducted by Paint and Coatings skill council of India, at Karaikudi, on 6-24 November 2017.
12. Workshop on National Corrosion day 2016 conducted by NCCI, at Kalasalingam university Krishnankoil, on 8 April 2016.
13. Workshop on National corrosion day 2015 conducted by NCCI, at Gandhigram university Dindigul, on 17 April 2015.
14. Workshop on Principles and Practice of Advanced EPR Spectroscopy conducted by CECRI at Karaikudi, on 19 March 2012.
15. Workshop on Marine corrosion and surface engineering 2012 conducted by NCCI & Annamalai University, at Parangipettai, on 24-26 November 2011.
16. National Workshop on Recent Trends in Electrochemistry conducted by CECRI, at Karaikudi on 28 Apr 2011.
17. Workshop on International corrosion awareness day 2011 conducted by CECRI, at Karaikudi on 25 April 2011.
18. Refresher course on Corrosion Science & Engineering conducted by CECRI, at Karaikudi on 16-20 August 2010.

### **Symposium/Conferences/Congress / Seminars Attended**

1. One-day webinar on Mechanical Testing of composites – A Comprehensive Overview of Essential Tests by Zwick Roell, on 7<sup>th</sup> November, 2024.
2. One-day webinar on Efficiency Increase the Tensile Testing of Metal to ISO-6892-I, and ASTM E8/E8M by Zwick Roell, on 6<sup>th</sup> November, 2024
3. One-day International webinar on Challenges and Opportunities Associate with the Photo Voltaic Panels by Koneru Lakshmaiah Univeristy (KL Univeristy), Andra Pradesh on 30<sup>th</sup> September, 2024.
4. One-day National webinar on National Intellectual Property Awareness Mission by Intellectual Property Office, India, at New Delhi, on 18<sup>th</sup> September, 2024.
5. One-day webinar on Understanding Fluid Flow in Geological Materials Using Dynamic Micro-CT by Tescan Group, on 8<sup>th</sup> May, 2024.
6. One-day webinar on Introducing the Tescan Spectral Suite by Tescan Group, on 9<sup>th</sup> April, 2024.
7. One-day webinar on Non-destructive High Resolution Time Resolved 3D/4D Multiscale Analysis of Battery Cells and Their Components by Tescan Group, on 8<sup>th</sup> February, 2024.



## CURRICULUM VITAE

8. One-day webinar on How to Boost Your Battery Production and Performance with NMR Technology by Bruker, on 30<sup>th</sup> November, 2023.
9. One-day webinar on Design, Synthesis and Electronic Modulation of Carbazole Embedded Macrocycles By Mendeleev's Chemistry Club, St. Joseph's College, Tiruchirapalli, on 7<sup>th</sup> September, 2023.
10. International online EndNote <sup>TM</sup> 21 Certification series 2023 by Clarivate, on 22 August 2023.
11. One-day webinar on Electron Paramagnetic Resonance Spectroscopy: A Defense against Environmental Aggressors by Bruker, on 11<sup>th</sup> July, 2023.
12. One-day webinar on Science Communication for Society Development: A necessity By Social Development Federation, Agra, Uttar Pradesh, on 28<sup>th</sup> February, 2023.
13. One-day National webinar on Nanomaterials for Novel Applications by Ramco Institute of Technology, at Rajapalayam, Tamilnadu, on 13<sup>th</sup> January, 2023.
14. One day online AWSAR (Augmenting Writing Skills for Articulating Research) webinar on Understanding Popular Science Writing by Department of Science and Technology (DST) & Vigyan Prasar (VP), 10<sup>th</sup> August, 2022.
15. One day online AWSAR (Augmenting Writing Skills for Articulating Research) webinar on Understanding Popular Science Writing by Department of Science and Technology (DST) & Vigyan Prasar (VP), 18<sup>th</sup> July, 2022.
16. One day online AWSAR (Augmenting Writing Skills for Articulating Research) webinar on Popular Science Writing and Journalism by Department of Science and Technology (DST) & Vigyan Prasar (VP), 30<sup>th</sup> June, 2022.
17. International webinar on Nanopore Sequencing overview and Applications in by Centre for Research and Innovation School of Natural Science, Adichunchanagiri University, BG Nagara, Karnataka, 17<sup>th</sup> June, 2022.
18. One day online AWSAR (Augmenting Writing Skills for Articulating Research) webinar on Understanding of Science Communication by Department of Science and Technology (DST) & Vigyan Prasar (VP), 11<sup>th</sup> May, 2022.
19. One day International Colloquium on International Lecture Series IV: Polymer Science and Materials Chemistry by Kirori Mal College, University of Delhi at Delhi 28<sup>th</sup> April, 2022.
20. One day National Seminar on NAAC Revised Assessment and Accreditation Framework – An Approach By IQAC, Hindu College, University of Delhi at Delhi 10<sup>th</sup> May, 2022.
21. One day National webinar on Two-Dimensional Materials: Graphene and Beyond, Centre for Nanoscience and Nanotechnology & Centre of Excellence for Energy Research, Sathyabama Institute of Science and Technology at Chennai, 28<sup>th</sup> March, 2022.
22. International webinar on Rheometry and its Applications in Exploring Materials Characteristics and Technological Potential by Centre for Research and Innovation School of Natural Science, Adichunchanagiri University, BG Nagara, Karnataka, 11<sup>th</sup> February, 2022.

## CURRICULUM VITAE

23. International webinar on Two Dimensional Nanostructures for energy conversion and Storage Applications by Centre for Research and Innovation School of Natural Science, Adichunchanagiri University, BG Nagara, Karnataka, 24<sup>th</sup> December, 2021.
24. International webinar on Research and Clinical Application of Flowcytometry by Centre for Research and Innovation School of Natural Science, Adichunchanagiri University, BG Nagara, Karnataka, 17<sup>th</sup> December, 2021.
25. International webinar on Emerging Challenge in the Advanced Phytochemicals Against the Antibiotics Resistance by Centre for Research and Innovation School of Natural Science, Adichunchanagiri University, BG Nagara, Karnataka, 3<sup>rd</sup> December, 2021.
26. International webinar on Hierarchical Zeolites: Preparation Pathways and Potential Application by Centre for Research and Innovation School of Natural Science, Adichunchanagiri University, BG Nagara, Karnataka, 26<sup>th</sup> November, 2021
27. One day webinar on a phytochemical atlas of Indian medicinal plants for harnessing traditional knowledge by MANAV-The Human Atlas Initiative-Department of Biotechnology (DBT), Government of India, 11<sup>th</sup> November, 2021.
28. National webinar on Nanoporous Activated Carbon for Energy Storage and Energy Conversion by Nadar Mahajana Sangam S. Vellaichamy Nadar College of Arts and Science, Madurai, Tamilnadu, 13<sup>th</sup> October, 2021.
29. One day webinar on Popular Science Writing-AWSAR (Augmenting Writing Skills for Articulating Research) by Department of Science and Technology (DST) & Vigyan Prasar (VP) & Agharkar Research Institute Pune, 3<sup>rd</sup> September, 2021.
30. National webinar on Plagiarism, Citation and Reference in Social Science Research by St Alphonsa College of Arts and Science, Kanyakumari, Tamilnadu, 3<sup>rd</sup> September, 2021.
31. International Webinar on Chemical Science and Technology - 2021 (IWCST-2021) organized by the Chem power Association and Department of Chemistry, Srinivasan College of Arts and Science, Tamil Nadu on 27<sup>th</sup> August 2021.
32. First International (virtual) Conference on emerging porous Materials (ePorMat-21) organized by NISER & VIT & IIT, during 29-30 July, 2021.
33. One-day webinar on q NMR and structural elucidation by Bruker, 13<sup>th</sup> July, 2021.
34. One day Global Webinar on Recent Advances on Energy Storage and Conversion Materials organized by Karpagam Academy of Higher Education, at Coimbatore, 5<sup>th</sup> July, 2021.
35. One day National Webinar on Future of lithium based batteries in Indian scenario organized by Karunya Institute of Science and Technology, at Coimbatore, 18<sup>th</sup> June, 2021.

## CURRICULUM VITAE

36. One day Seminar on Energy Materials organized by Sathyabama Institute of Science and Technology, at Chennai, 4<sup>th</sup> June, 2021.
37. One day FDP webinar on Intellectual Property Rights organized by Sri Sarada Niketan College for Women, at Karur, 2<sup>d</sup> June, 2021.
38. One day webinar on Infrared Spectroscopy: Fundamentals and Applications organized by Deshbandhu College (University of Delhi), at Delhi, 8<sup>th</sup> April, 2021.
39. International Technical Symposium on Corrosion (ITSC 2021) organized by NCCI & CSIR-CECRI, at Karaikudi, 3<sup>rd</sup> March, 2021.
40. Twelfth International Symposium on Advances in Electrochemical Science and Technology (ISAEST-11) organized by SAEST, at Chennai, 7-10 January, 2019.
41. Thirteen International Symposium on Surface Engineering & Paint Coatings Expo-2017 organized by SSPC, at Pune, 15-17 February, 2017.

### Personal Details

- **DOB:** 9<sup>th</sup> June, 1983
- **Marital status:** Married
- **Health/Blood Group:** Excellent/A +
- **Nationality/Religion:** Indian/Hindu
- **Language Known:** Tamil, English, Hindi.
- **ORCID ID:** 0000-0001-8552-736X
- **Researcher ID:** V-2164-2018
- **Scopus ID:** 1747797
- **Link :** <https://scholar.google.com/citations?user=atkObZsAAAAJ&hl=en>

### Professional References

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2. **Dr. S.S. SREEJAKUMARI, Senior Scientist**  
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3. **Dr. R. ANANTHAKUMAR, Scientist,**  
Advanced Research School for Technology and Product Simulation (ARSTPS)  
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## CURRICULUM VITAE

4. **Dr. B. SARAVANAKUMAR, Scientist,**  
Laboratory for Advanced Research in Polymeric Materials (LARPM),  
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### Declaration

I hereby declare that the above particulars are true to the best of my knowledge and belief.

Date : 06.12.2024

Yours Faithfully,

Place : Chennai

T.SIVA