# RESUME


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## Academic Record

PhD, Department of Metallurgical and Materials Engineering 2012, IIT Madras, Chennai, India.

M.E, Industrial Metallurgy 2003, PSG College of technology, Coimbatore, India.

B.E Mechanical Engineering, 1999, National Engineering College, Tuticorin, India.

## Career Record

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|---|---|
| June 2000-July 2001 | Technical co-ordinator.<br>Tekhtron India, Madurai 625011. |
| Aug 2001 – Feb 2003 | M.E., Industrial Metallurgy Degree course<br>PSG College of technology, Coimbatore 641004 |
| Mar 2003 - Oct 2003 | Junior Research Fellow<br>PSG College of technology, Coimbatore 641004. |
| Oct 2003 – Sep 2007 | Scientist “B”<br>ARCI, Hyderabad 500005. |
| Oct 2007 – Sep 2012 | Scientist “C”<br>ARCI, Hyderabad 500005. |
| Oct 2012 – Sep 2017 | Scientist “D”<br>ARCI, Hyderabad 500005 |
| Oct 2017 – Jan 2024 | Scientist “E”<br>ARCI, Hyderabad 500005 |
| Jan 2024 – till date | Scientist “F”<br>ARCI, Hyderabad 500005 |

## Details of Research and Work Experience

**Tekhtron India, Madurai 625011, June 2000-July 2001**

- Process design for manufacturing plastic moulds and press tools.
- Tool room machine maintenances.

**PSG College of technology, Coimbatore 641004. Mar 2003 - Oct 2003**

- Boronising surface modification process development.
- Multi component boronising process development.
- Boronising microstructure modification using LASER, Plasma and Induction heating.
- Boronising on extrusion and wire drawing dies.
- Design and fabrication of molten salt bath reactor for titanium coating on stainless steel.

**Advanced Research Centre International, Hyderabad, 2003 – till date**

- Developed a process for making nano silver powder and nano silver coated powder synthesise in lab scale and pilot scale level.
- Developed a process for making nano silver-coated ceramic drinking water filter for disinfect potable drinking water system.
- Process development of nano powder synthesis by microwave plasma.
- Nano powders of $TiO_2$, $SiO_2$, $Al_2O_3$, $ZrO_2$, $Fe_2O_3$, NiO, Ni, W, Mo and Si synthesised using microwave plasma.
- **Developed a process for nano $TiO_2$ coating on ceramic floor and wall tiles for self-cleaning application.**
- Developed a process for nano $TiO_2$ coating on glass windows for self-cleaning application.
- Design and methodology for selective solar coatings and ellipsometer data analysis
- Research and development of visible light induced self-cleaning coating.
- Development of anti-reflective coatings on borosilicate glass by sol-gel and chemical etching.
- **Anti-tarnishing coting development for silver and copper alloys by sol-gel.**
- Development of high temperature compliant glass seals for metal-ceramic bond.
- Design and fabrication of glass metal rigid bonded sealing machine.

## Technology Demonstrated

- Nano silver coated ceramic drinking water filters technology, successfully transfer to SBP technology, Hyderabad for commercialisation.
- Demonstrated the self-cleaning coatings technology on ceramic glazed wall tiles.
- Demonstrated anti-reflective coatings on 1-meter-long borosilicate glass tube.
- Demonstration of anti- tarnishing on complex shape by sol-gel dip coating process.
- Demonstrated high temperature metal- ceramic joining (Invar 36-$SiO_2$) technology for 800$^oC$ application.
- High-temperature (1400$^oC$) silicide based oxidisation resistance coatings on C-103 by fused slurry method.

## Technology Transfer

- Nano silver coated ceramic drinking water filters technology, successfully transfer to SBP technology, Hyderabad for commercialisation.
- Transfer of high temperature adhesive for metal ceramic seals in pilot scale production line to RCI/DRCO for in house application.

**On-going activities**

- Development of pack and slurry aluminising on mild steel and stainless steel for high temperature oxidisation resistance applications.
- Development of silicide coatings on refractive metals by fused slurry coatings techniques.
- Development of thermal barrier paints using inorganic binders.

## Patents filed

1. An improved process for the preparation of nano silver-coated ceramic candle filters by J. Revathi, **K. Murugan**, T. N. Rao (1249/DEL/2011) dt 28/04/2011.

2. Indian patent application titled “An improved process to make coating compositions for transparent, UV blocking coatings on glass and a process of coating the same” by R. Subasri, Nabormi Mukhopadhyay and **K. Murugan**: filed as 1152/DEL/2014 dt 29-04-14.

**Patents Granted**

1. A method of preparation of anti-tarnishing organic-inorganic hybrid sol-gel and coating the same by **K.Murugan**, R. Subasri, G.Padmanabham: **Indian Patent No 366131**, Date of Grant 5/5/2021.
2. A process for the preparation of nano silver and nano silver coated ceramic powders by **K. Murugan**, T.N Rao **Indian Patent No 284812**, Date of Grant: 20/03/2017.
3. An improved process for obtaining a transparent, protective coating on bi-aspheric / planoconvex lenses made of optical grade plastics for use in indirect ophthalmoscopy", invented by Raghavan Subasri, Sowntharya Logapperumal, **Karuppiah Murugan, Indian Patent No: 343375** Date of Grant 05/08/20.

**Awards**

- Platinum best group awards at the Asia Nanotech Camp 2011, August 15-28. **Seoul, South Korea**, Title: Sustainable Nanotechnology for saving water.

- Best poster award in International conference and Exhibition on heat treatment and surface engineering 2013 titled on "Self-cleaning function test on nano $TiO_2$ coated glasses and glazed ceramic tiles". May 16-18, 2013 Chennai Trade Centre, **Chennai, India**.

## Sponsored Projects

| S. N | Details of Research Projects | Funding Agency | Total cost | Role/Status | Outcome/Major Results/Highlights |
|---|---|---|---|---|---|
| 1 | Microwave plasma synthesis of nano-particle | HPCL | 90,00,000.00 | Co/PI Completed | **1. Acquired knowledge to indigenous the technology. 2. Three international publication. 3. Rs 80, 00,000.00 sanction from HPCL for new material development**. |
| 2 | Development of anti-tarnishing coating technology | Titan (I) ltd | 6,00,000.00 | PI/ Completed | **1. Successfully demonstrated the technology to Titan (I) ltd, Hosur. 2. One Indian patent filed.** |
| 3 | Development of anti-reflective coatings. | SERB | 50,00,000.00 | PI/ Completed | **1. Established AFM workstation. 2. Demonstrated AR coatings on 1-meter long tube.** |
| 4 | Development of compliant glass sealants for high temperature application. | DRDO-RCI | 20,00,000 | PI/ Completed | **1. Successfully demonstrated 2. Radiography pass 100%. 3. Satisfied on simulated test. 4. Technology transfer completed.** |
| 5 | Development of self-cleaning surfaces using IREL developed nano TiO2 particles | IREL | 70,00,000 | PC/ Completed | **1. Successfully demonstrated self-cleaning coating process. 2. Established self-cleaning performance work station at IIT Madras. 3. Two international publications. 4. One PhD as co-guide** |
| 5 | Development and supply of multi component oxidation resistant coatings on Niobium (C103), Molybdenum (TZM) and Tungsten heavy alloy (WHA with slurry based thermal barrier overlay | DRDO-DRDL | 68,00,000 | PI/ongoing | **1. Initial feasibility studies and standard operating procedure for C103 was established.** |

| Major consultancy work | | | | | |
|---|---|---|---|---|---|
| 1 | Development of interconnect material for solid oxide fuel cell | Ion America Chennai | 20,00,000.00 | Co-PI/ Completed | Literature Report with chemical/microstructural/ structural/ thermal characterization of given samples. |
| 2 | Supply of Anti-reflective coated glass tubes | Atria Power, Bangalore | 7,00,000.00 | PI/ Completed | Supply of 4 meter long AR coated borosilicate cover glass for solar thermal application. |

**Declaration**

I hereby declare that the entries in this resume are true to the best of my knowledge

**Date: 29/01/2024**