

AR&DB Materials and Manufacturing Panel

Workshop and Ask Me Anything Session
24th August 2026

Prof. Suhas S. Joshi Ph.D., FNAE, FNASc, FNA
*Chairman, AR&DB, Materials and
Manufacturing Panel*
*Director, Indian Institute of Technology
Indore*



रक्षा अनुसंधान एवं विकास संगठन
रक्षा मंत्रालय, भारत सरकार
**DEFENCE RESEARCH &
DEVELOPMENT ORGANISATION**
Ministry of Defence, Government of India

Panel Members

1	Prof. Suhas S Joshi, Chairman, Director IIT Indore,	2	Dr. Kingsuk Mukhopadhyay, Director DMSRDE Kanpur	3	Dr. G. Madhusudhan Reddy Director DMRL
4	Dr. S.K. Pandey, Scientist `F' & Secretary Aero R&D Board (AR&DB), HQtrs.	5	Dr. Ankathi Raju, Director, DRDL	6	Dr. Gopinath, Sc. H, and Associate Director DMRL.
7	Dr. Amit Bhattacharjee, (retd.) Sc. G, DMRL,	8	Dr. Arvind Kumar Gupta, Scientist G (retired), DRDO	9	Dr. Harish C Barshilia, Chief Scientist and Head, NAL
10	Dr. John Rozario Jegaraj, Scientist G, DRDL	11	Dr. Mithun Palit, Scientist G, DMRL	12	Dr. D.K. Das, (retd.) Sc H, DMRL
13	Dr. Satyam Suwas, Professor, IISc., Bangalore	14	Dr. Ramakrishnan, Director DYSL-SM	15	Prof. Nilesh J Vasa, IIT Madras
16.	Dr Manoranjan Patri, Former Chairman, CEPTAM, DRDO	17	Dr. Santhanam, Sc F, DRDL	18.	Prof. Palani Iyamperumal Anand, IIT Indore
19.	Dr. Tamil Selvi. Sc. E. GTRE	20	Dr. Smita Soni, Sc. E. DL Jodhpur		Experts from DRDO, ISRO and NAL: 16

Overall Approach



Proposal invited in the following areas

ADVANCED MATERIALS DOMAINS

QUANTUM MATERIALS



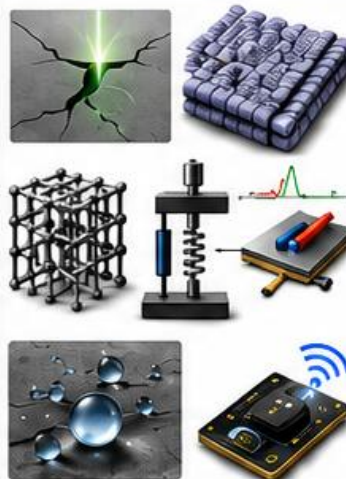
- 2D & LAYERED MATERIALS
- TOPOLOGICAL & CORRELATED MATERIALS
- SUPERCONDUCTING MATERIALS
- SPINTRONIC & QUANTUM SENSING
- MATERIALS FOR QUANTUM DEVICES

MATERIALS PROCESSING



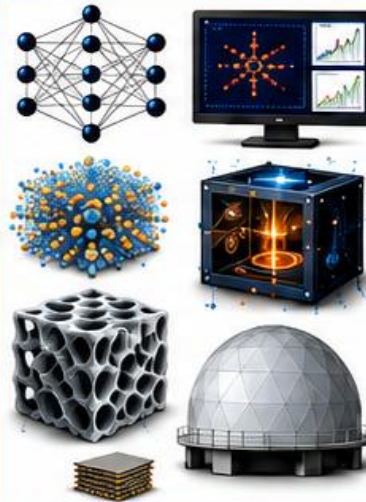
- POWDER PROCESSING & SYNTHESIS
- THIN FILMS, COATINGS & SURFACE MODIFICATION
- HEAT TREATMENT & MICROSTRUCTURE CONTROL
- JOINING, CONSOLIDATION & DENSIFICATION
- PROCESS MODELLING & OPTIMIZATION

SMART MATERIALS



- SELF HEALING MATERIALS
- SELF REPORTING MATERIALS
- SELF REPAIRING MATERIALS
- META MATERIALS
- TECHNICAL TEXTILES
- DAMPING MATERIALS
- THERMOELECTRIC MATERIALS
- SELF CLEANING MATERIALS
- SENSORS & ACTUATOR MATERIALS FOR SHM

MATERIALS DESIGN



- AI/ML BASED DESIGN
- COMPUTATIONAL MATERIALS DESIGN
- PROCESS MODELLING & SIMULATION
- INTEGRATED COMPUTATIONAL MATERIALS DESIGN
- MATERIALS FOR QUANTUM COMPUTING
- CELLULAR MATERIALS
- PROTECTIVE MATERIALS FOR CBRN THREATS
- RADOME MATERIALS
- HIGH DENSITY MATERIALS

STRUCTURAL MATERIALS



- LIGHTWEIGHT HIGH-STRENGTH ALLOYS
- METAL, CERAMIC & POLYMER COMPOSITES
- FATIGUE, FRACTURE & DAMAGE TOLERANCE
- IMPACT & BALLISTIC RESISTANT MATERIALS
- CORROSION-RESISTANT STRUCTURAL MATERIALS

HIGH TEMPERATURE MATERIALS



- SUPERALLOYS & INTERMETALLICS
- ULTRA-HIGH-TEMPERATURE CERAMICS & CMCS
- THERMAL BARRIER COATINGS
- OXIDATION, CREEP & THERMAL FATIGUE RESISTANCE
- MATERIALS FOR AERO-ENGINES & HYPERSONICS

Proposal invited in the following areas

MANUFACTURING DOMAINS

SURFACE ENGINEERING



- Corrosion
- Nitriding or laser nitriding
- Laser or shot peening of surfaces
- Catalytic degradation of surfaces
- Anti-icing paint
- Surface Coatings
- Oxidation of refractive alloys

SMART MANUFACTURING



- Industry 4.0
- Digital twin technology
- Shop floor automation
- AI/ML for manufacturing

ADDITIVE MANUFACTURING



- AM of Composites
- AM of SMAs
- AM of AI alloys
- AM of high energy materials

ADVANCED MANUFACTURING



- Hybrid manufacturing
- Ti-Ni based brazing
- Insitu characterization of defects during welding
- Hybrid casting
- Forming of complex shapes
- Machining of super alloys, hard ceramics, and extreme materials
- Sustainable manufacturing
- Processing of high temperature ceramics
- Noise/Vibration free manufacturing of gear boxes
- Micro and nano manufacturing
- Optical component manufacturing
- Strain wave gears
- Precision and bulk preform manufacturing

SYSTEMS AND DESIGN MANUFACTURING



- Soft robotics
- Manufacturing of UAV
- Reliability and Life assessment
- Aging structures
- Smart and Intelligent structures
- Small drones and Swarms
- Polymer based soft robotics
- Reverse engineering
- Adaptive morphing
- Stealth
- Structural health monitoring

METROLOGY AND INSPECTION

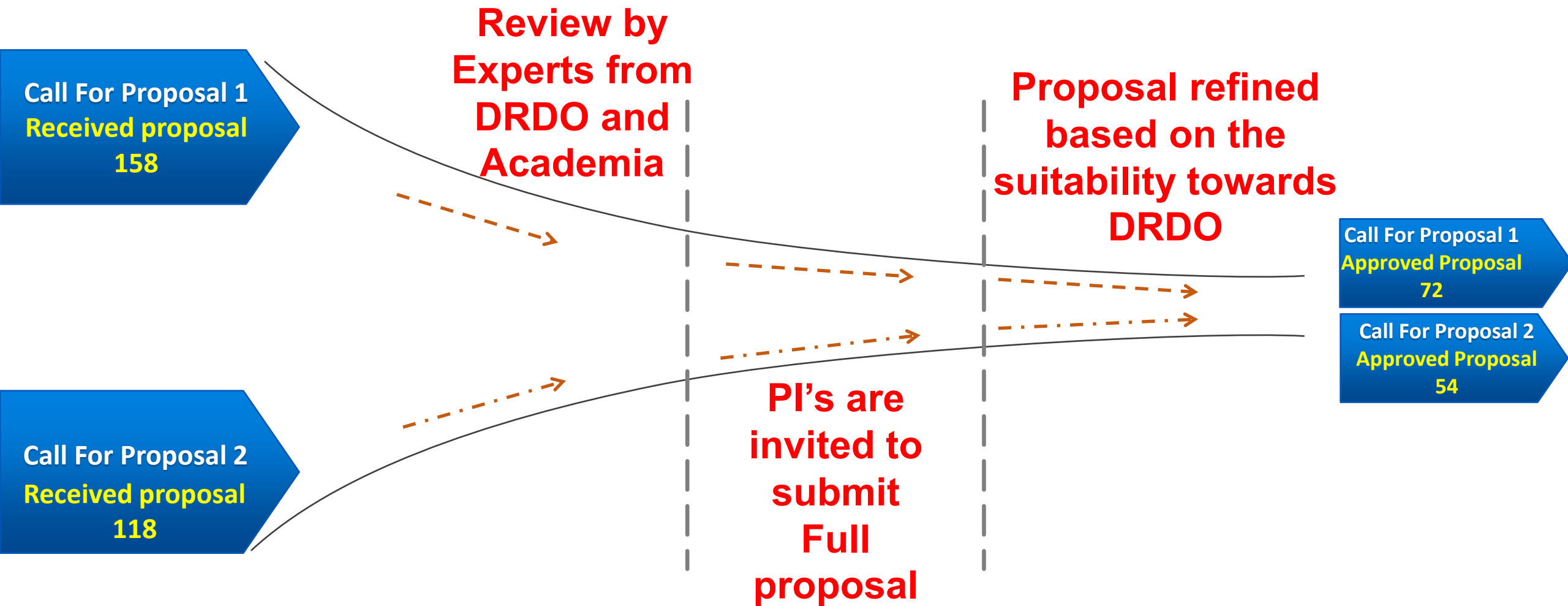


- Large volume metrology

DEVELOPING A DATA BASE FOR MANUFACTURING



Overview of First and Second Call for Proposal of AR&DB MM panel



Points for proposal submission



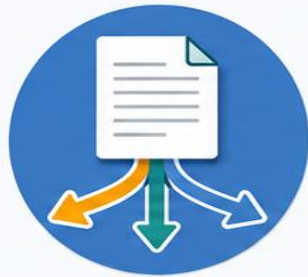
Establishing connect with DRDO

Must for every proposal, and the most difficult task

Complete proposal if connect already established

Conceptual proposal if no specific connect exists

Full proposal follows review and acceptance



Nature of the proposal

Program driven (top down)

Research driven (bottom up)

Strategy driven (indigenization)



Aimed at solving a problem

Clear definition of the problem being solved

How the solution helps resolve the issue



Scientific merit

Detailed review of relevant literature

Methodology: experimental, numerical, mathematical, or combined

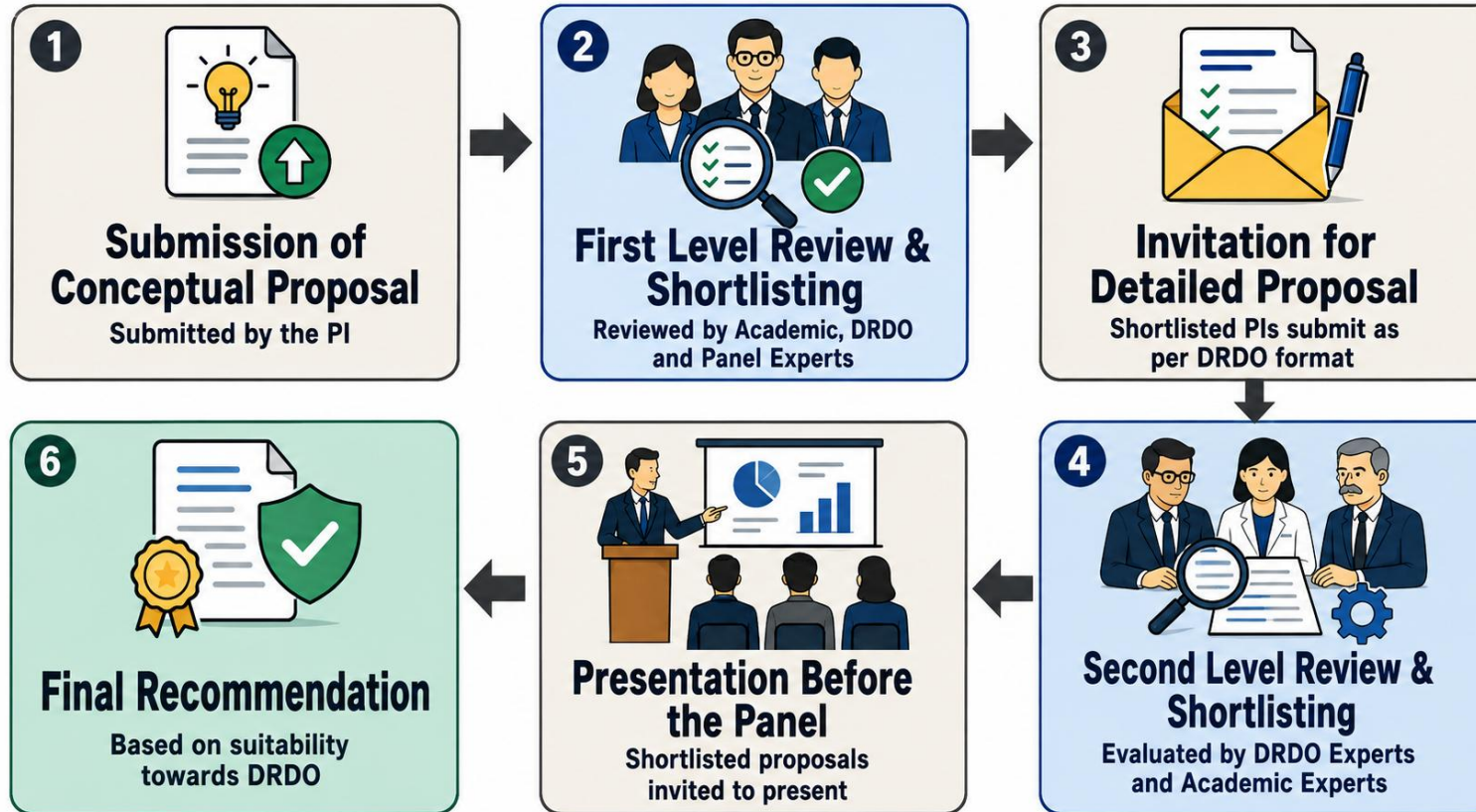
Results and analysis leading to the solution



Deliverables

Clear definition of the deliverables

Process of Evaluation



- **Funding Available by AR&DB – M&M**

AR&DB – M&M Panel can recommend the proposals up to INR 1 Cr.

- **Proposals with Higher Funding Requirements**

Proposals with more than INR 1 Cr funding will be reviewed but recommended to the council for further review and approval. Ideally, proposals with larger funding requirements (more than INR 1 Cr) may be submitted as a Conceptual Proposal at first. Please Refer to the website

<http://ardbmmpanel.iiti.ac.in/>

Link for ARDB MM Panel portal - <https://ardbmmpanel.iiti.ac.in/main>

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Ministry of Defence, Government of India

Home Call for Proposal **Proposal Submission** Project Proposal Form

**Aeronautics Research & Development Board
Materials & Manufacturing Panel (DRDO)**

Click on Proposal Submission

Vision

Make India technologically strong by establishing world class cutting edge aeronautical science and technology base to provide our Defence, Space and Civil Aviation sectors a decisive edge by equipping them with internationally competitive systems and solutions.

Mission

To encourage and fund basic and applied research in pertinent scientific disciplines directly relevant to our aeronautical systems needed for future by enabling and supporting emerging talents, particularly in academic and research institutions to create and evolve a potential knowledge-base system applicable to future aeronautics needs of the country.

Last

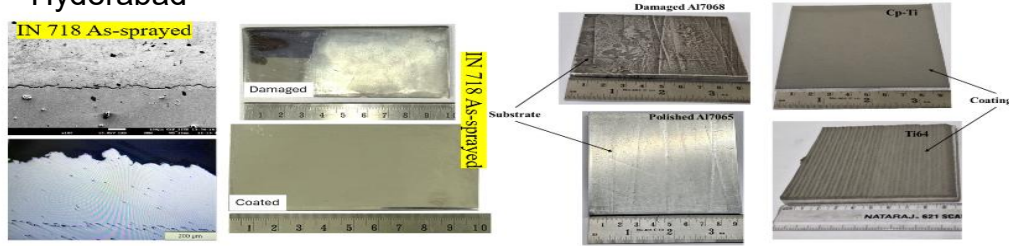
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Ongoing projects and their Suitability towards DRDO

Project Title : Repair of High Value Al-Alloys using Cold Spray Technology

PI & Institute: Dr. Ayan Bhowmik, IIT Delhi

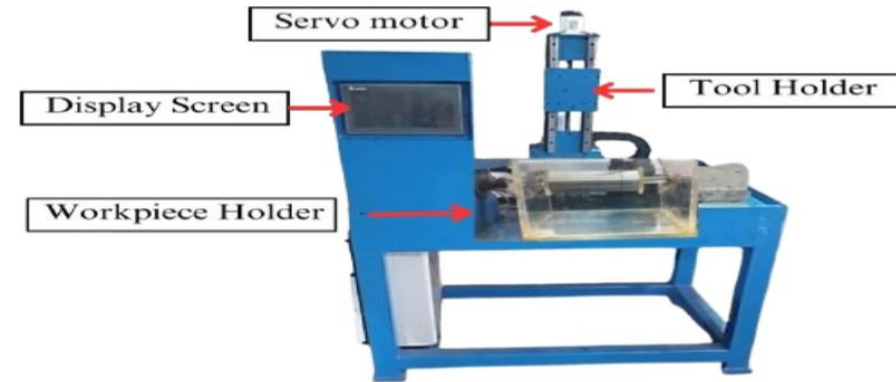
Domain Lab / Scientist: Dr. Chandan Mondal, DMRL Hyderabad



Project Title : Design and Development of a Reconfigurable Electrochemical Machining Center for Rocket Shells

PI & Institute: Dr. J Ramkumar, IIT Kanpur

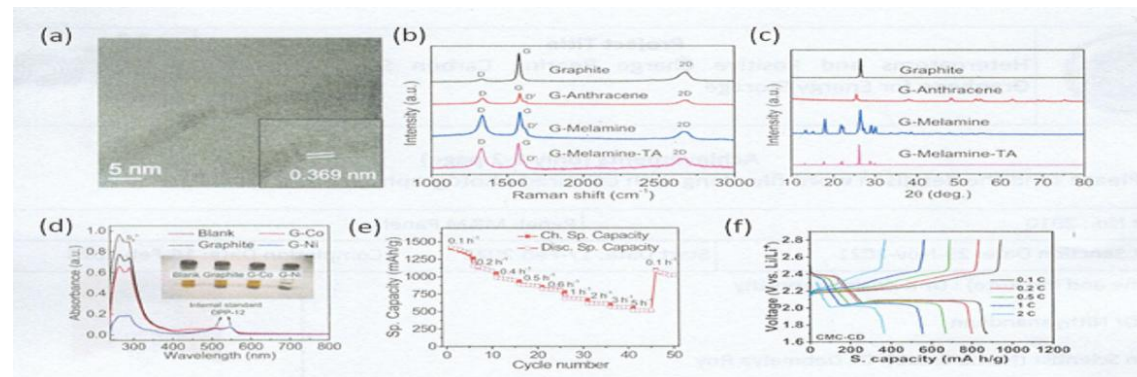
Domain Lab / Scientist: Dr. J. John Rozario Jegaraj, DRDL



Project Title : Heteroatoms and Positive Charge Bearing Carbon Skin Comprising Graphene for Energy Storage

PI & Institute: Dr. K Krishnamoorthy, CSIR-NCL Pune

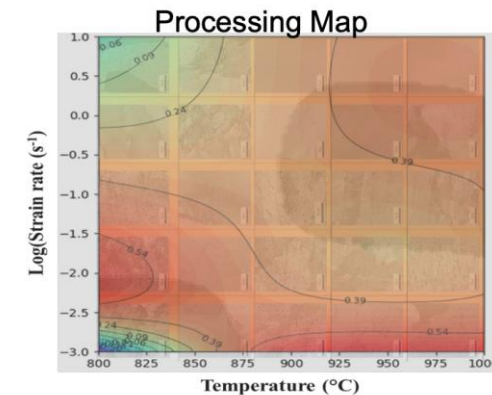
Domain Lab / Scientist: Dr. Debmalya Roy, DMSRDE Kanpur



Project Title : An extensive investigation of microstructure evolution during heat treatments & hot forging of high strength β -Ti-5553 alloy

PI & Institute: Prof. Shanta Chakrabarty, KIIT

Domain Lab / Scientist: Dr. Amit, DMRL, Hyderabad



Thank You