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**Principal Investigator, DRDO Project on High Pure Gallium/ GaN & DST Projects on Development & Automation of Controlled Melting & Freezing & Refining Systems**

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1. Please be informed that, I had also worked as Postdoctoral Fellow/ Visiting Scientist in NTU, Chang Hua, Taiwan, LCM, France CNR-Parma, Italy, in the areas of Semiconductor Crystals, Wafers, and Thin film Structures/ Device Fabrication & VLSI / Clean Room aspects. Also to state that, I had delivered more than 120+ Guest/ Invited/ Keynote lectures/ addresses over years to EEE/ECE/EIE/ Nanotechnology/VLSI / (B.E & M.Tech) students in various Universities/ NITs/ Engineering Colleges ( IEEE-Students Chapters/MRSI/SSI/IACG / Techno-Fests. etc. forums/ meetings/ Departments) in AP, Tamilnadu, Karnataka, Orissa etc. broadly covering the principles and current practices & trends in advanced micro-optoelectronic & nano electronic materials, crystals manufacturing / VLSI/processing, device fabrication, class clean packaging technologies, solar energy and nano-materials.
2. Ultra high and nano pure (8N+) starting pre-cursor materials are required for advanced emerging GaAs; thin films based nano-epitaxial Solar Cells technology. Gallium ultra-high purification is a very challenging process technology. Availability of systems required for its purification, processing and packaging and published results on these areas are seldom available, No vendor supplies zone-refiner and solidification system specifically required and suitable for gallium ultra-high purification. Gallium processing systems have to be fabricated indigenously, criticality tests have to be carried out and lab scale process has to be optimized before taking up batch scale operations\
3. This is to inform and state that, we at C-MET Hyderabad laboratory for the last 18 years are engaged in advanced R&D for the development of indigenous process technology for ultra high purification of gallium and indium to 7N+ purity level. Purification of 4N+/5N Gallium from both Indian and other raw material sources was carried out by employing of combination of zone melting, directional freezing and solidification processes. Relying on and revolving around the Innovative Solidification & Crystal Growth Concepts, `An

indigenous rotational directional solidification system and novel ultra-purification process method/ technology for 7N+ pure gallium' was developed under major DIT/DST/DRDO projects. The purity of 7N+ grade gallium through GD-MS analysis at NRC, Canada and using 7N+ pure gallium developed by C-MET, GaAs LPE layer(s) were also grown and the quality of the layer(s) tested at Calcutta University. Limited quantity of 7N+ pure Ga samples was also made available to SSPL, Delhi and IISc. Bangalore for GaAs epi-growth trials under DRDO sponsored C-MET-Calcutta University Joint Project on Gallium.

4. The major findings and the first time results on purification/ segregation of impurities in Indian source of Ga were reported and the out come was submitted to DRDO/NRDC for patenting. [1) Met. Mater. Process. 18 (2006) 107, 2) Jl. Cryst. Growth 311, 1521(2009) and 3) Jl. Appl. Phys., 104, 1, (2008) with the referee comment - 'I congratulate the authors on a nice piece of work'. The major finding of the projects]