

Defence Functional Materials, Products and Prototypes

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Abstract

Materials, products and prototypes as also their technologies are key for the development and deployment of sub-systems and systems for various defence applications. Advanced research in materials and micro-components, such as Precursors, MEMs, NEMs, Nano Devices, Solar Cells and Flexible Electronic Devices have become further more crucial for defence applications, especially for electronic systems. In this context, the use of smart and functional materials have attracted considerable attention world-wide in recent years. DMSRDE, being the premier non-metallic special and functional materials laboratory of DRDO at Kanpur, India, has taken up several major initiatives, projects and programmes to address these important technological needs for the Indian defence.

DMSRDE of DRDO at Kanpur, India has made some very important contributions in the past 4 decades, especially in the last 3-4 years to develop several latest functional materials and materials technologies – based devices and sub-systems, which include nanomaterials (CNTs, fullerenes, graphenes, nano-wires, nano-rods, nano-ferns, nano-flowers, thin films etc.), stealth & camouflage materials, speciality fluids, and smart polymers & textiles. The lab also works on several engineering materials, such as Modular Composites; Polymers, Polymer Precursors, Resins and PMCs; Ceramics and CMCs; Speciality Paints and Primers; Coolants; Synthetic Fuels & Lubricants; Fibres and Fabrics for over 100 critical products & >20 Prototypes, sub-systems and Systems for Indian armed forces and allied services (LIC, MHA and CRPF etc). Flexible electronics, the subject of present presentation, is an emerging core area of importance for advanced and futuristic defence warfare, especially for surveillance, early detection, control, navigation, combat and assessment. An effort will be made in the present talk to elucidate various scientific research studies conducted and the technology and device development tasks undertaken at DMSRDE in this field, particularly in case of organic / inorganic solar cells, supercapacitors, batteries, sensors, smart camouflaging, e-textiles, solar powered tents, e-suites for soldiers etc.

Keywords: Functional & Special Materials, Nanomaterials & Devices, Flexible Electronics, Defence products

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