Guest Editorial

Armament Research and Development Establishment (ARDE), Pune, is one of the premier establishments of Defence Research and Development Organization (DRDO) engaged in the research and development of various armament systems required for the three Services, viz., Army, Navy, and Air Force. As a part of its armament development activity during the late sixties, a need was felt to develop piezoelectric materials for the actuation of warheads on its own. This requirement was critical as it aimed towards self-reliance in the arena of piezoelectric materials. A research programme was therefore initiated to develop lead zirconate titanate (PZT) materials. As a sequel to this, technologies of various grades of PZT materials were developed, leading to setting up of pilot plant manufacturing facilities. It is a matter of pride for ARDE that so far more than eight lakh components of these materials have been supplied to the users both from defence and civil sectors in the country, thereby achieving huge savings of foreign exchange.

With the technology evolving at a rapid rate, ARDE is also making sincere efforts to keep pace with this scenario. As a part of this, a project for setting up of a DRDO Centre for Piezoceramics and Devices at ARDE has been undertaken, with an aim to enhance the existing pilot plant facilities, so that development of newer materials and devices can be undertaken, followed by transfer of know-how to the entrepreneur's for bulk production. Already, some of the PZT technologies have been transferred to the industries. We have also developed materials like PMN-PT, 3-3 piezo composites and nano PZT, which are under evaluations and their technology will be shortly transferred to the industries interested in such technologies.

In the past few decades, electroceramics has emerged as a unique class of materials due to their adaptability and applications in the field of science and engineering including aerospace. This is mainly because of their exceptional dielectric and piezoelectric properties, tailorability, flexibility, and ease of processing for customer-tailored products. However, electroceramics materials and devices are facing ground-breaking technological challenges, calling for the need to have novel processing methods, modelling, simulation, and characterisations to develop improved quality materials.

To cater to the above needs, 'National Seminar on Advances in Electroceramics (NSAE-2006)' was conducted at ARDE during 05-06 May 2006, to provide a platform for various researchers, scientists, engineers, and entrepreneurs of the country to interact and share their

knowledge and expertise to undertake joint collaborative programmes towards achieving self-reliance in the field of electroceramics. The Seminar was attended by more than 200 senior scientists, researchers and entrepreneurs of the country.

In response to call for papers for the Seminar, there was an overwhelming response from the researchers of various organisations. In the first instant, 106 abstracts were received and based on the recommendations of the referees, the authors were requested to submit full papers. After recommendations by the peer review committee, 79 papers were accepted for the oral/poster presentations. The seminar was featured as an excellent forum for close interaction among academicians, R&D scientists, and industry professionals to share their views and learn from each others experience.

At the end of the seminar, the panel of experts suggested that a special issue of *Defence Science Journal* be brought out covering selected papers relating to the *processing, characterisations and devices* to disseminate the technological knowledge in the border way. Hence, an effort was made to select 15 best papers having relevance to the subject. It is hoped that this special issue will kindle the spark of zeal among the readers of *Defence Science Journal* in the area of electroceramics.

I am thankful to Shri Surendra Kumar, Director, ARDE for his valuable guidance in bringing out this special issue of *Defence Science Journal* by which readers shall be immensely benefited. My thanks are also due to Sarvashri H. Muthurajan, B. Praveen Kumar, H.H. Kumar, Virendra Singh of PZT Centre, ARDE for their necessary support in bringing out this special issue.

Last but not the least, I greatly value and appreciate the initiative taken by Dr A.L. Moorthy, Director, DESIDOC, and his Editorial Team of *Defence Science Journal* in bringing out this special issue.

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