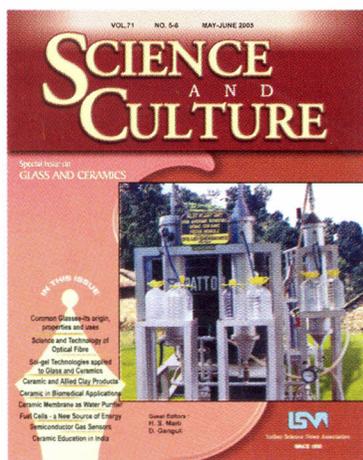


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EDITORIAL

GLASS AND CERAMICS



TO THE common man, and this includes the intelligent layman, ceramics have long been conceptually associated with pottery; one cannot say that the times have changed in respect of this concept. There is nothing very wrong in this, though, as pottery in different aesthetically pleasing forms, colours and shines have attracted the imaginations of people for decades, and the admirers include innovative artists across the globe then and now.

While this intermingling of art and science was going on, another set of inquisitive people were looking for more practically useful examples of ceramics in all kinds of necessity-driven forms and sizes : materials that could be resistant to onslaughts of high temperature, high pressure, sudden impact, corrosive chemicals and a host of other destructive forces. Thus came to the fore materials like alumina(oxide of aluminium), lovingly called the workhorse of ceramics, and a series of other ceramics like zirconia, titania and titanates and, of course, silica obtained by various means of synthesis and fabrication – and all of them found useful applications that required strong materials, high temperature materials, materials with piezoelectric properties, gas sensing and photocatalytic capabilities – just to touch the surface. And to think that all this time, millions of users were, or still are, unaware that a mosquito repeller or a main door buzzer may be driven by a piece of ceramic!

Another ancient development is glass, which also witnessed developments in composition and homogeneity

through a variety of techniques and hence, achievement of useful properties like low or zero thermal expansion and high thermal conductivity, high or no optical transparency at selected wavelengths, high or low refractive index put into fibres to films for optical communication, acquired ability to serve as windows in high temperature installations and so many other applications, achieved successfully with silica, silicates, phosphates, borates, and currently fluorides - again, just to touch the surface!

There can therefore be a large showcase of such ceramics and glasses – materials of long range and short range orders respectively in terms of atomic dispositions - that can be subjected to the required engineering from bulk manufacturing to precise shaping. As mentioned above, options in synthesis and fabrication are many, and temporally dynamic in their growth and modifications.

This special issue of Science and Culture has focused on some major problems which afflict the common man where Glass and Ceramics can provide remedies. The contributions are mostly from the scientists of the Central Glass and Ceramic Research Institute.

Articles in this special issue take up some of these materials and the stories of how they are prepared, why we need them, and precisely where and how. The hope is to bridge a gap between the researcher and the user, leading to a harmony in the concept we talked about at the beginning, and thus, a better and concerted understanding of what we need and how we obtain it from the vast area of periodic and aperiodic structures that we have named ceramics and glasses.

This special issue of Science and Culture has focused on some major problems which afflict the common man where Glass and Ceramics can provide remedies. The contributions are mostly from the scientists of the Central Glass and Ceramic Research Institute (CGCRI), a constituent unit of the Council of Scientific & Industrial Research in the country. The Institute known to be a cradle of glass and ceramic materials research has been actively engaged in the alleviation of country's problems related to materials especially glass and ceramics ever since its formal inception. Over decades, the changes in the national economic scenario ushered in the need for new dimensions of research. In keeping with the trends of globalization and the national needs of recent decades, the Institute has identified certain key areas of research for technology development which could contribute significantly to those economic sectors such as health, environment, water, energy, information and communication, rural development which concern all of us in the society. Although the articles in this issue are by and large presented by the CGCRI scientists, there is a special article on ceramic education to attract and encourage the country's young talents who can take up career in ceramic technology. This article points to the present bottlenecks in the ceramic education system and suggests blueprints for improvement. Further, any interested student particularly at the school level can get a career counsel as it provides much needed information on the B.Tech degree/ Diploma courses conducted by the Indian universities and societies.

This special issue carries articles on the CGCRI's technologies on Bio-ceramics and Ceramic membranes which have been carried to the masses for mitigation of perennial problems of health including non-availability of quality water for the less privileged community. The article on optical fibre traces evolution, communication, fibre

types, design and fibre optics activities by the Institute. The strategic partnership with industry players for innovative research in fibre technology is a commendable progress. There is a detailed article on fuel cell which is likely to replace the conventional fuel to meet the world's futuristic energy needs. The article on Sol-Gel technology also deserve special mention in the sense that the ceramic coatings leading to smart windows and scratch resistant types on glassy and polymer substrates marketed currently on a limited scale have the potential capability to be up scaled to meet the large demand of world market. The article on Ceramic sensors describes various types of sensors developed by CGCRI. The last but not the least, the article on Traditional Ceramics makes special mention of the programme of ceramic clusters in the state of Gujarat that has contributed to general welfare of a large number of ceramic industries and thereby rural development in this prosperous state. It also highlights CGCRI's innovation in Jaipur Blue pottery. One reason why a similar movement has not been forthcoming in West Bengal is the lack of high quality raw materials and non-availability of appropriate fuel on which the industrialization of any region depends. The article traces the history and present status of traditional ceramics in West Bengal.

We thank all the authors for their valuable contribution. We also thank the two outstation writers for their viewpoints on ceramic education. Special thanks are due to Dr. G.Banerjee, Scientist, CGCRI for the co-ordination with the authors and the vital linkage he maintained with the Indian Science News Association. We finally thank all concerned with the publication of this special Issue. □

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Guest Editors