

Editorial

For many productive years, periodicity and crystal structure have been the basis of condensed matter. Indeed, they were the bulwark of materials science. They produced the transistor and the computer, marvels of technology. However, it became increasingly evident that long range order and simple elemental devices were becoming more and more constraining both in physics and in technology. As thinner dimensions and complex needs became important, scaling was a very fundamental barrier.

A few years later, the basic field of amorphous and disordered material made its appearance and suddenly offered not only an unexpected new science but because of its unique degrees of freedom, it was able to challenge the tyranny of the crystalline lattice. This coincided with many new needs in our society. In information, multi-elemental materials could be atomically designed utilizing the various degrees of freedom to demonstrate new physical, chemical and electronic mechanisms, including for the first time plasticity, the basis of cognitive function. In energy, the twin pillar of our global economy, there was also the realization that amorphous and disordered devices could become an important factor based upon similar fundamental principles.

It became clear that the problem of energy was connected with geography. Oil is a causative factor of war as it is of pollution and the terrible problem of climate change. "Suddenly" solar energy and hydrogen as the ultimate fuel became central not only to the vehicular industry but to the whole of humanity. What was once a simple battery of two or three elements was being replaced by one with as many as eleven elements. "Suddenly" optoelectrical devices, nanostructures disordered by their very nature, high speed switches, phase change memories, optical and neurophysiological-type memories became also a necessity rather than an interesting topic for discussion.

The above amorphous and disordered field became known as Ovonic science and technology. It was the initiating and driving force that was able to offer humanity a way of scientifically and technologically going forward to solve the problems both societal and scientific that it was facing. Multifunctionality lead to new Ovonic devices, energy systems and infrastructure, providing the means to bring the underdeveloped portions of our world to the parity that it deserves.

Science is, like art and literature, a defining part of our civilization. Its significance in the course of evolution continuously solved problems that could meet the material needs of our society and at the same time, science is most exciting as it offers us new industries, new technologies, and new answers to the age old questions posed by philosophers as to the nature of the world we live in.

We are so pleased that Ovonic science is expanding its international role. In 2003 the leading optical phase change organization changed its name to European Symposium on Phase Change and Ovonic Science. Congratulations to all of our colleagues and collaborators in the field. We look forward to many more. Our deep thanks to Professor Mihai Popescu for founding this new Journal of Ovonic Research.

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