

Materials Education: Globalization Opens New Frontiers, Opportunities and Challenges

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Materials education faces the challenges of globalization in the XXI century. We witness economical crises, the great global decisions on climate changes and the corresponding geopolitical rearrangements presently in course. From the standpoint of materials a new complex set of pressing variables emerge: Energy, hunger, health and sustainability. These parameters should and must be considered and they bring great opportunities for the materials needed to accompany these pressures. Since we are commemorating 200 years since the birth of Darwin, the great pioneer of Evolution Theory, it may be instigating to ask: What are the main evolutionary pressures on science, technology and innovation in materials? Can we apply concepts of struggle for survival to products, processes and services related to materials, most important also, to materials education?

Let me point out some of the main pressures: The global population is expected to double by the end of the century. The tremendous added demand for energy, water, food and health care will require a completely different stock of materials, often with completely different properties. An important area in bio-sciences related to food, pharmaceuticals will have to be considered, such as bio-sensors and other bio nano technology based materials. At the molecular level: Drug design, catalysts and intelligent membranes, such as for water desalinization with reverse-osmosis and for hydrogen based electrical batteries. An important area is tropical agriculture, responsible in the case of Brazil for 30% of our GDP. Agriculture in all regions requires use of many different materials such as pesticides, fertilizers and soil protectors. The commodities for bio energy, such as ethanol and bio diesel are increasingly important and require new materials and new production-chains, which in turn require new materials. To meet the demand of these large-scale needs of globalization the inventory of new materials must be obtained. Symposia in this International Conference on Advanced Materials (ICAM2009) address a number of relevant areas and their corresponding need for materials.

All these considerations show that the efforts to provide proper curricula, continued education, the use of distance learning and the web, will require a completely new educational structure in materials science and engineering. ICAM2009 provides an important platform for developing strategic contributions to navigate the road map for the special needs of education in the twenty first century.