POLYMER ADDITIVES

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Polymer additives have been variably called “Miracle Workers” or “Unsung Heroes” of plastic industry. They perform a myriad of functions that enhance the property of plastics in diverse range of applications. Take the example of polypropylene. What was important? Was it the discovery for which its inventors got the Nobel Prize or those unknown people who found a way to stabilize an otherwise very unstable polymer, thus, making it a useful article of commerce? For those who understand chemistry, PP has notoriously unstable chemical linkages which belie its utility in applications. Yet such an intrinsically unstable polymer is consumed today in such large quantities without any concern of degradation. This is the contribution of the additives to polymer industry

Additives are today a business exceeding 3 million tons per annum of global capacity which adds value to over 150 million tons of global plastics consumption. The value of plastics additive industry exceeds US $ seven billion.

As in many other sectors of the plastics industry, the additive sector is also witnessing consolidation. Currently fragmented businesses are witnessing product consolidation, bringing greater clout in the marketplace. On the contrary Indian additive business is still very fragmented with sub optimal size.

The key drivers of the world wide additives business is greater consumer demand for superior performance plastics at lower costs, environmental impact of products in the context of life cycle analysis and occupational safety associated with the additives manufacturing industry. Today it is difficult to introduce an additive in a material without a rigorous life cycle analysis of the material so that the additive used is compatible with the goals of sustainability of the material use and its disposal. Life cycle analysis has become a rigorous science and is being introduced as a subject in curriculum for students in universities. Occupational health and safety consideration is driving introduction of new product forms, with greater safety in handling and dispensing. Powders are being formulated as granules or emulsions in water. Liquid dispensing is intrinsically safer than powder handling. Encapsulated products are being increasingly experimented with to avoid handling and inhalation toxicity.

Polypropylene is the fastest growing markets for additives. Additive manufacturers track closely the growth in PP markets in applications as they need to develop new products to keep up with the demands from the growing PP markets. Greater clarity, improved organoleptic properties, superior aesthetics derived from better pigment dispersions are driving new additives markets. PVC is the workhorse polymer consuming a substantial share of additives. Phthalates account for about half the volume of additives manufactured and continue to hold its own in spite of safety threats and consequent negative perceptions. Flame retardants are one of the fastest growing segments of the additives markets.

Additives are becoming increasingly sophisticated.Multifunctionality, need for new and improved additives for recycled materials and processing of commingled plastics, increasing growth of inorganic - organic hybrids, such as glass fiber reinforced thermoplastics, filled polymers, clay polymer nanocomposites, composites of plastics with natural material such as, wood and celluloses, now termed as Green Composites are all creating new demands on additive performance. Polymeric additives, such as functional polyolefins and functional tailored waxes are attracting significant attention

The impact of nanoscience and technology on additives is likely to be significant. Nanooxides, nanotalcs and nanocarbon will be used in conjunction with plastics to derive new properties which are not possible with currently used micron size particles. This in turn will need new additives to prevent filler agglomeration and dispersion of the additive in nanodimension in plastics.

With increasing cost of petroleum derived feedstock's there is an urgent need to look for more sustainable and renewable resources for additives manufacturing. Additives which are more natural may also be needed to replace some of the currently used additives from the point of health and safety.

R&D in Indian additives industry is very meager. We are satisfied with imitating products already developed elsewhere. The new patent regime will prevent us from copying patented products .There is great scope for innovation in this sector. There was a time when developments in India used to lag behind similar developments in more advanced economies by about two decades. With the increasing "flattening" of the world this time has shrunk. Countries like India see developments which are only a few years behind more advanced countries. Our consumers are now becoming more aware, thanks to the ICT revolution, and will demand the same performance and safety that the more advanced economies provide to their consumers. Wisdom, therefore, lies in anticipating consumer needs and developing products which meet those needs. Leaders will be those who can anticipate consumer needs and preferences and bring products in markets ahead of time, thus gaining the first mover advantage. Those who wait for the markets to develop before they introduce a product will be the laggards.

Indian industry will have to learn to lead, rather than follow. We have to innovate and lead from the front. We have the skills. We only need the will.

I wish the seminar all success