Envisioning Tomorrow

PLASTICS & RUBBER GOES GLOBAL

Material with added value
Circular Economy – Part 1

Focus on contemporary issues

Medical progress

Perfect protection

Well positioned in the global market

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Focus on contemporary issues

H umankind is facing serious global challenges, from climate change to digitisation, and these are the result of human activities. It is our responsibility to control this development, towards sustainability. Scientists have found that in 2018, we had completely used up the estimated annual share of the earth’s available resources by 1 August of that year. And we call the so-called “earth overuse day” every year in order to avoid restrictive measures that would hinder our progress. It is therefore right for us to ask ourselves, why we must address many modern applications.

Tackling challenges

Yet, polymer materials are among the most important – and major challenges – and not simply because of limited availability of materials. Plastic and rubber are available in an incredible number of materials, which can be produced in a sustainable way. And, ideally, should always be reintroduced into the production cycle. We have now reached the stage. Material designers need to be more aware of the responsibility to control their activities. It is our responsibility to control our activities.

Medical progress

Plastics have been established as medical materials for a long time, not only in the production of dentures. Leaves made from acrylic glass revolu- tionised ophthalmology and artificial corneas are now made from plastic. The use of plastic for medical purposes has minimised the risk of infection. Artificial heart valves, artificial joints and blood vessels, as well as many other implants, are also made from plastics. The ultimate challenge is to manufacture a plastic heart that is virtually identical to the real organ in size, form and function. Outstanding achievements have already been present- ed in the field of orthopaedic plastics. Plastics support the abdominal wall, correct deformities such as calcaneal spur and improve or even partially replace the function of mobile body parts such as hip or knee joints. Plastic prosthetics not only replace the body parts’ main functions. Experts are currently discussing the potential advantages and disadvantages of artificial organs and artificial corneas.

People with plastic hearts beat

When it comes to protection from head impact or shock injuries, as well as protecting car passengers from impact injuries, new solutions or ways to safely end up liquid-based systems hence preventing leaks, plastic solutions are the best choice. Materials have the best protection developed with materials that have proven to be unbeatable, and offer an almost unlimited application spectrum.

Materials and wear

With their polymer armour under the football shirt, American footballers often look like modern knights. They protect themselves from injury by wearing bullet-proof vests made from a combination of plastic fibre and metal mesh. Plastic and rubber are versatile materials that, over the world are used in the production of high performance prosthetics that will improve the patients’ quality of life. Their development relies on high-performance functional materials that are not rejected by the human organism. Many polymer materials have the perfect properties for medical purposes. Versatility in application

Plastics can be established as medical materials for a long time, not only in the production of dentures. Leaves made from acrylic glass revolutionised ophthalmology and artificial corneas are now made from plastic. The use of plastic for medical purposes has minimised the risk of infection. Artificial heart valves, artificial joints and blood vessels, as well as many other implants, are also made from plastics. The ultimate challenge is to manufacture a plastic heart that is virtually identical to the real organ in size, form and function. Outstanding achievements have already been presented in the field of orthopaedic plastics. Plastics are the perfect ingredient of any personal protective gear: plastics are unbeatable, and offer an almost unlimited application spectrum. Better hygiene thanks to plastics

When they are dealing with epidemiology, medical staff will use protective polymer-based suits. The fact that they are disposable prevents accidental pathogen contamination.
Money doesn’t grow on trees, as they say, but often it lies right in front of us: every PET bottle is a loss of valuable resources. That said, however, collecting these PET bottles and reintroducing them into the material cycle is well worth the effort.

Purified polyethylene terephthalate (PET) is the perfect starter material for high-quality products such as bottles, film or fibres.

Collect and recycle

Despite the rising proportion of regenerateable resources in polymer material, it is still predominantly made from crude oil. Thermal recovery of PET after its life cycle is a tried-and-tested approach, but it releases emissions that are harmful to the environment – as is the case with conventional combustion processes. This method also wastes valuable material that could be put to much better use by the industry. In contrast to other plastics, which are copolymers, PET is a monomer with high-quality properties and is, as such, almost unique in its perfect suitability for recycling. The German population’s passion for collecting PET bottles was triggered by the introduction of a deposit return system, which led to a highly successful return rate of up to 98%, according to a publication by Forum PET. About one third of the returned bottles is reused to make neu PET bottles, another third is used for industrial film and about one fifth goes into the production of textile fibres. The use and deployment of recycled PET products obviously inspires new ideas among companies, namely to reuse PET bottles for the production of school bags, jumpers and trainers, as well as film for furniture and car parts.

Preparing the ground

The thriving business with disposable PET bottles is supported by the introduction of central collection hubs, where manually introduced bottles are crushed and compressed by a compactor. At the recycling plant, the material is sorted and cleansed, then shredded into fingernail-sized pieces, which can be plastificised and turned into pellets – the starter material for the production of new, high-quality plastic products. Other industrially endorsed collection systems are also in place for recycling plastic window profiles and used agricultural film. Scientists are already working on the biotechnological optimisation of the plastics recycling process. They are conducting tests with bacteria and enzymes that digest and break down polymers into their basic constituents. This interdisciplinary approach holds potential for new jobs, which is likely to be put into practice. Plastics are materials with added value, which, when collected and segregated, can easily be reintroduced into the material cycle. Efficient recycling will become increasingly important – and will be a major issue at K 2019.