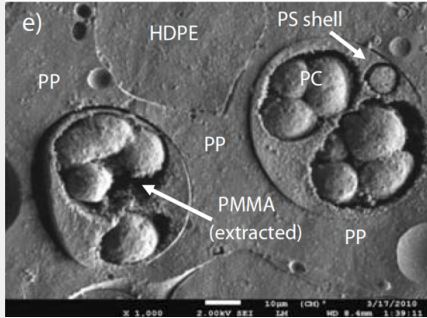




New recycling polymer technology



Background

Plastics (PE, PP, PS, PET, PVC) represent more than 90% of post-consumer waste, yet, recycling rates struggle to exceed 30%. Other than the lack of infrastructure, poor recycling economics and a confusion about recyclability, one of the main reasons, is that post-consumer products are often constructed with multiple polymers, sometimes closely bonded and difficult to segregate with current sorting technologies. In addition, because of their immiscibility, multi-phase polymer blends display low mechanical properties when formed into a final product. As a result a large proportion of unsorted polymers are sent to landfills instead of being recycled.

Technology

Prof. Basil Favis and his team have developed a technology that solves the problem of recycled co-mingled plastics and is able to divert discarded plastics (like polystyrene) from landfill. Here, thermodynamically driven polymer segregation and phase encapsulation are used to locate multiple phases within one of the two major phases. Starting from a co-continuous blend of high density polyethylene (HDPE) and polypropylene (PP), hierarchically encapsulated polymers are found to be exclusively located, in a stable fashion, within PP, when the principal HDPE/PP interface is compatibilized. Up to 40 % of waste mixed plastic could then be blended with a combination of recycled polyethylene, polypropylene and the appropriate compatibilizer. The properties of the resulting material demonstrates high ductility with tensile and impact properties essentially equivalent to a grade of pure polypropylene with a lower manufacturing cost. The technology can increase the volume of recycled polypropylene currently marketed by 30% (and for which an high demand has not been filled yet). The process itself is simple, requires standard process unit and low CAPEX to upgrade a plastic recycling plant.

Application

This technology targets the recycler who owns the raw material and processes them to produce a new polymer blend material in the form of pellets. Since the blend produced here has similar properties to polypropylene, this technology could be used to manufacture a wide range of molded products such as plastic chairs, toys and containers, etc.

Competitive Advantages

- Process able to convert 30% of plastic waste into a PP matrix
- Mechanical properties matching pure PP
- Ability to turn plastic waste to high added value material
- End-product 10 to 20% cheaper than recycled PP
- Simple standard process and low CAPEX

Patent

US patent 9, 670, 344 POLYMERIC MATERIAL AND PROCESS FOR RECYCLING PLASTIC BLENDS

Next Steps

The technology is available for licensing. We are looking for an industrial partner to implement the process at its facilities.

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