

The Future of Plastics.

By

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Local and global plastic pollution in the last twenty years has tarnished the reputation of plastics globally but up to now has not stopped its continual growth. Invented by scientists and engineers in the early 1900s and developed from the mid 1950s, plastics has become one of the basic building blocks of contemporary life in the 2000s. This easily processed, low cost versatile material has found application in many areas that compete with wood, metals, ceramics and glass in an incredibly broad range of uses and over the last hundred years, man made plastics has worked its way into everyone's lives but at the same time managed to spread plastic cancer throughout the world.

It is certain that in a hundred years time plastics will still hold a dominant position in everyday use, however as with all major global developments both social and market pressure will have a big impact on its further application.

Recycling and reuse of plastics is still relatively new. In developed countries, such as the UK there was a realisation in the 1980s that there were just not enough 'suitable holes' left in the country to fill all the UKs waste. The Landfill option was squeezed and incineration started to become an attractive alternative option. This coincided with energy cost increases and the decline in UK coal production. My father for example was involved in the production of cement, which used vast amounts of coal and in the 1980s, cement manufacturers explored using domestic waste and used car tyres as an alternative energy source to coal. The 1990s saw the emergence of incineration for household and industrial waste as a preferred option to landfill and even now in 2022 we locally have waste collecting vehicles advertising as being 'Zero landfill', meaning that they are 100% incineration.

In the 1990s, China rapidly developed its own plastics processing industry for a very wide range of applications and at that time was happy to receive low cost recycled plastic waste from countries such as the UK. However, in the 2000s China stopped accepting overseas used plastic. This period also coincided with the general realisation that burning contributes to CO₂ production and global warming and large-scale incineration is not necessarily a satisfactory long-term solution for recycling used material. Most plastic products are combustible although some composite materials such glass or carbon fibre composites and electrical appliances have only partial combustibility.

The major global plastic polluter is plastic packaging that currently has little resale value and is difficult to recycle. In my view this should be incinerated together with household waste. In order for waste incinerators to function, they need a certain fraction of combustible material and waste plastic packaging or complex multicomponent materials containing some plastic are still best incinerated with the added bonus of some energy recovery. Yes this will produce CO₂, but we live in an imperfect world and need to live with this.

Plastic bottles (together with what is known as Pots Tubs and Trays, PTT) are good candidates for genuine recycling. There is now technology for identifying the type of plastic PTT and bottles are made from and these usually 'semi-pure plastic' species can then be recycled. At present this is generally carried out by using the recycled plastic for a 'lower grade application'.

A better alternative to this would be that the original manufacturer of the plastic was compelled to chemically convert the recycled plastic back to monomer and then use it as a feedstock for further plastic manufacture. This would be similar to the way the steel, glass and paper industries successfully currently operate using their respective recycled products.

The properties of polymeric plastic articles can be so superior to other materials in terms of mechanical and weight performance that their future use is assured. They are the nearest thing to many natural materials such as wood, leaves, human skin and many animal and human components. One of the only real Achilles heels in relation to plastics applications is their poor temperature performance and potential flammability where events such as the Grenfell Tower inferno should be a continual reminder that plastics are not the answer to every application.

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