



**HAL**  
open science

# Towards a circular, low-carbon emission plastics industry

Patricia Krawczak

► **To cite this version:**

Patricia Krawczak. Towards a circular, low-carbon emission plastics industry. *Express Polymer Letters*, 2022, 16 (9), pp.901-901. 10.3144/expresspolymlett.2022.65 . hal-03714459

**HAL Id: hal-03714459**

**<https://hal.science/hal-03714459>**

Submitted on 11 Apr 2024

**HAL** is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

Editorial corner – a personal view

## Towards a circular, low-carbon emission plastics industry

Patricia Krawczak\* 

IMT Nord Europe, Institut Mines-Télécom, Univ. Lille, Centre for Materials and Processes, 59508 Douai, France

The ‘ReShaping Plastics’ (<https://www.systemiq.earth/reshaping-plastics/>) report issued in April 2022 aims at helping leaders and decision-makers to find effective pathways to a highly circular, climate-neutral plastics system in Europe, focusing on the most important plastic-using sectors (packaging, household goods, automotive, and construction). Actually, the European plastics system is already adapting to address the challenges of climate change mitigation and circularity, but not yet fast enough to align with the goals of the Paris and Glasgow climate agreement. To significantly reduce waste disposal and greenhouse gas emissions, upstream and downstream solutions appear complementary and most effective when deployed together. According to the Circularity Scenario developed in the ‘ReShaping Plastics’ study, by 2050, the plastics system could achieve 78% circularity with 30% of waste being avoided through reduction and substitution and 48% being recycled (27% mechanical recycling and 21% plastics-to-plastics chemical recycling), leaving 9% only in landfills and incinerators.

Even if the quantity of recycled plastics waste is continually increasing, there are still difficulties to overcome with the quality of the recycled plastics, and hence challenges for the industrial and scientific communities. Efforts are currently devoted to improving the sorting of plastics waste. For example, imaging and artificial intelligence (AI) may enhance sorting systems commonly based on near-infrared light technology. Neural network-based deep learning is being increasingly employed to detect and segregate fractions that were previously difficult to sort. Besides AI, digitisation and automation can also help

increase sorting machines’ performance. Also, laminates, contaminants, inks and odours in plastics waste remain tricky issues. Fortunately successful trials were reported to delaminate, deink, and remove volatile components and deodorise the recyclates during extrusion compounding.

In complement to mechanical recycling, chemical recycling is also increasingly coming into focus, with significant investments from both major players in the plastics industry and innovative start-ups in that field. Chemical recycling (*e.g.* depolymerisation, dissolution, solvolysis, pyrolysis, enzymatic decomposition ...) is a potential solution for complicated cases and particularly challenging plastic streams, especially for food packaging.

A net-zero plastics system is within reach, at least in Europe, if we can mobilise all actors in the plastic value chain. So, let’s go!



Prof. Dr. Patricia Krawczak  
Member of the International Advisory Board

\*Corresponding author, e-mail: [patricia.krawczak@imt-nord-europe.fr](mailto:patricia.krawczak@imt-nord-europe.fr)  
© BME-PT