

Editorial corner – a personal view

High-performance composites and medical applications of polymers – the sunny sides of the polymer industry

Gábor Szabó^{*} 

Department of Polymer Engineering, Faculty of Mechanical Engineering, Budapest University of Technology and Economics, H-1111 Budapest, Műgyetem rkp. 3., Hungary
MTA-BME Lendület Lightweight Polymer Composites Research Group, H-1111 Budapest, Műgyetem rkp. 3., Hungary

In previous years, dark clouds have gathered in the sky above people working in the plastics industry. After the half-century-long golden age they have a bad public reputation because of the waste generated [<https://doi.org/10.3144/expresspolymlett.2020.1>]. While engineers, scientists, and governments now struggle to increase plastics recycling, there are areas where the sun is always shining, and no one can question the necessity and benefit of the products and solutions. High-performance composites and polymers for medical applications are probably the most prominent of these.

The production of energy-efficient vehicles is almost impossible without high-performance composites. These high strength-to-weight ratio structures make significant weight reduction possible. This weight reduction enabled excellent fuel efficiency with conventional engines, making the production of moderate-weight electric cars possible, where the weight saved can be filled by battery packs. Another beneficial tendency is the creation of hybrid structures, where composite elements or local reinforcement patches are placed in critical locations. In aircraft, a jump in the composite part content could be observed with the composite fuselage introduced by both Boeing and Airbus. Also, in the generation of green energy, composites are widely applied in solar cells [<https://doi.org/10.3144/expresspolymlett.2022.69>], and wind turbine blades [<https://doi.org/10.3144/expresspolymlett.2019.15>]. Generally, in these applications, the multiple decades-long service life of the composite parts, demanding minimal maintenance, makes them greener and superior to any other alternative. Also,

self-healing [<https://doi.org/10.3144/expresspolymlett.2021.62>] probably has the highest potential in composites, adding to a circular economy.

In the other ‘sunny’ area, polymers for medical applications can also be linked to composites because these products have to function in or with the human body, whose tissues are also, in most cases, composite structures themselves. Besides the vast amounts of single-use products, there are a lot of polymer parts that stay with the patient their whole life, such as intraocular lenses, scaffolds [<https://doi.org/10.3144/expresspolymlett.2022.16>], stents [<https://doi.org/10.3144/expresspolymlett.2022.66>], and implantable devices. These products can help us to avoid or fight infections, stabilize health functions or drastically increase our quality of life. In these applications, everyone agrees with the positive impact of polymers. As a topic editor of Express Polymer Letters, I encourage authors to submit their findings in these two areas, which help the further progress of polymer science, and the ‘sun’ of these areas can also shed some healing light on criticized areas, assisting polymers in regaining their well-deserved place and respect in everyday life.



Dr. Gábor Szabó
Topic editor

^{*}Corresponding author, e-mail: szabog@pt.bme.hu
© BME-PT