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**P**lastic — you could be forgiven for equating it with cheap, artificial materials that have found their way into all walks of life. You might think of the frequent headlines lamenting the sheer volume of plastic waste that ends up in landfill or pollutes remote locations, such as our seas and deep ocean trenches.

But beyond all the negative headlines and commodity plastics such as packaging and plastic bags, work at the forefront of polymer research is delivering advanced materials that are helping to solve problems in areas ranging from energy and the environment to human health.

This Insight aims to provide a flavour of the opportunities offered by ‘fantastic plastic’ — polymeric materials with properties that have been precisely tailored to meet the needs of myriad low- and high-tech applications. The diversity of systems being explored and the applications being targeted are immense. This selection of reviews can cover only a fraction of them, ranging from the fundamentals of molecular design and synthesis to cutting-edge applications.

It includes a survey of the current state-of-the-art in producing more-sustainable polymers that eschew petrochemicals and use plant materials or carbon dioxide instead. There is a look at polymer-based materials that are designed to autonomously manage wear-and-tear by repairing themselves to prolong their useful lifetime, and result in regeneration and recycling after use. An examination of 3D printing using polymer-based soft materials shows how this technology is on the cusp of challenging conventional manufacturing around the world.

There is a discussion of how soft polymeric electronic materials enable devices to interface with biological tissues, facilitating new approaches to diagnostics, as well as disease prevention and control. And finally, a look at how polymer hydrogels can be crafted into objects that mimic biological structures shows how they can be put to therapeutic use.

We hope you enjoy this eclectic showcase of modern polymer research, and join us in celebrating the ingenuity of the researchers who continue to advance the field as it takes on the opportunities and challenges of the twenty-first century.

**Ros Daw, Claire Hansell & Magdalena Helmer**

*Physical-sciences editors*

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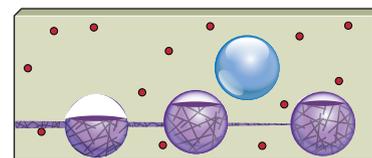
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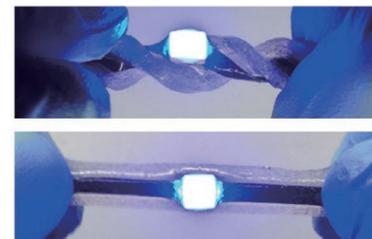
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