

Advancing PEF

In the rapidly evolving world of sustainable materials, OMV Technologies stands at the forefront of innovation by advancing the potential of polyethylene furanoate (PEF), a next-generation bioplastic poised to redefine packaging sustainability.

Why PEF matters

PEF is a 100 % biobased, recyclable polymer with superior barrier properties compared to traditional PET. Its enhanced oxygen, carbon dioxide, and water vapour barriers extend product shelf life, reducing food waste and environmental impact. Additionally, PEF's high mechanical strength enables thinner packaging, lowering material use while maintaining durability.

PEF also supports a circular economy due to its recyclability and reduced dependency on fossil-based plastics. As global sustainability goals intensify, PEF's unique attributes make it a promising alternative for a wide range of packaging applications.

OMV Technologies' role

OMV Technologies leverages its thermoforming expertise to explore PEF's applicability in creating high-performance packaging. Through extensive lab trials conducted in their Verona lab last year, OMV produced multilayer prototypes of PEF/PET/PEF and demonstrated PEF's potential in several critical areas:

- **Barrier improvements:** The multilayer prototypes showcased superior barrier to oxygen when compared to the monolayer PET prototypes, offering promising alternatives for applications requiring extended shelf life.
- **Recyclability potential:** OMV successfully tested recycling skeletons of the full polyester multilayer structures with high content of PEF, achieving lower haze in the final cups than for the recycled monolayer PET skeleton. This points to the feasibility of closed-loop recycling processes.
- **Multilayer simplification:** The trials revealed opportunities to streamline complex multilayer packaging, simplifying production, and enhancing recyclability.

The prototypes were developed as part of the EU-subsidized project PEFerence led by Avantium (Amsterdam, the Netherlands).

Custom thermoforming solutions

One of OMV's key focuses has been tailoring thermoforming solutions specifically for PEF. These solutions include optimizing heating and forming parameters to maintain PEF's structural integrity during processing. Trials confirmed that PEF can handle precise thermoforming while minimizing shrinkage – critical for food containers and trays.

OMV's innovative approach also includes developing specialized equipment configurations to ensure PEF's compatibility with existing manufacturing lines. This helps reduce potential barriers to adoption, enabling smoother industry integration.

Scaling up

Looking ahead, OMV is focused on addressing scalability challenges by refining its production techniques. The company's long-term goal is to integrate PEF into commercial packaging lines, opening new possibilities for brands committed to sustainability. Ongoing research aims to maximize efficiency, ensuring PEF-based packaging is both commercially viable and environmentally responsible.

OMV's commitment extends beyond technology – it includes collaboration with industry partners, educational institutions, and sustainability organizations. By fostering these connections, OMV is helping build a robust infrastructure that supports widespread adoption of PEF and other biobased materials.

By pushing the boundaries of material science and manufacturing innovation, OMV Technologies is shaping the future of sustainable packaging, setting new industry standards and driving progress toward a greener, more circular economy.

Collaboration with releaf®

In line with OMV Technologies' commitment to innovation and sustainability, the company has recently partnered with releaf, a pioneering brand developed by Avantium in sustainable packaging solutions. By combining OMV's expertise in thermoforming and releaf's focus on eco-friendly packaging, this partnership is set to accelerate the adoption of PEF in various industries, offering consumers more sustainable packaging options.

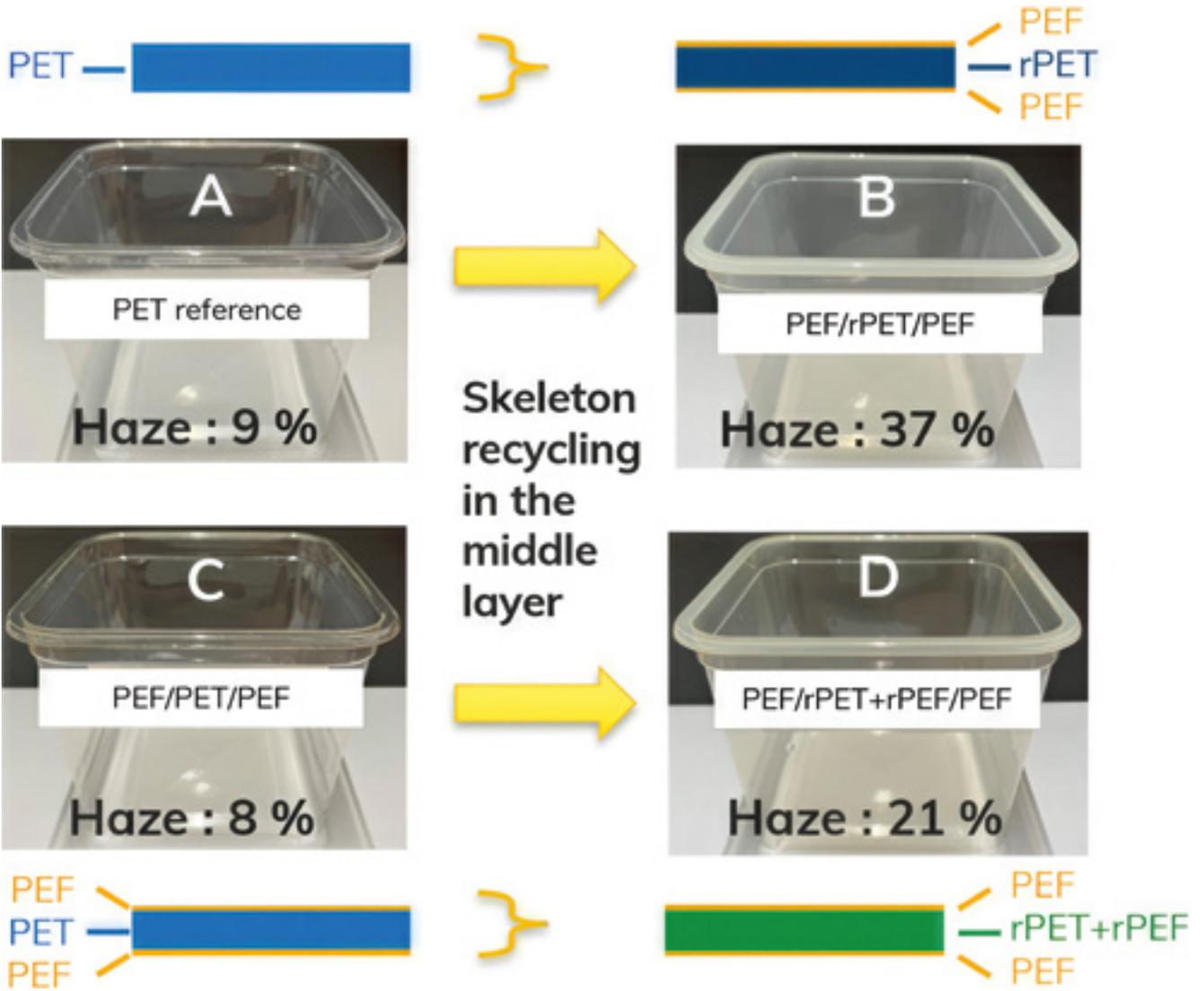
The authors acknowledge contributions of the PEFerence project that has received funding from the Bio-based Industries Joint Undertaking (JU) under the European Union's Horizon 2020 research and innovation program under grant agreement No 744409. The JU receives support from the European Union's Horizon 2020 research and innovation program and the Bio-based Industries Consortium. **AT**

<https://omvtechnologies.com>

Structure	PEF barrier content	BIF*
PET/PET/PET	0	1.0
PEF/PET/PEF	low	1.5
PEF/PET/PEF	high	2.4

*barrier improvement factor for O₂ compared to full PET structure

Upon recycling, PET tends to become hazy due to rapid crystallization during cast film extrusion. In the image, Cup B, which contains only rPET in the recycled middle layer, shows higher haze compared to Cup D, which contains both rPET and rPEF in the recycled middle layer. The biobased PEF helps reduce haze by partially inhibiting the crystallization of the middle layer during sheet extrusion



Magnetic for Plastics — The Leading Online Marketplace for the Plastics Industry



- **International Trade** in Raw Materials, Machinery & Products Free of Charge.
 - **Daily News** from the Industrial Sector and the Plastics Markets.
 - **Current Market Prices** for Plastics.
 - **Buyer's Guide** for Plastics & Additives, Machinery & Equipment, Subcontractors and Services.
 - **Job Market** for Specialists and Executive Staff in the Plastics Industry.
- Up-to-date • Fast • Professional
- plasticker**
the home of plastics