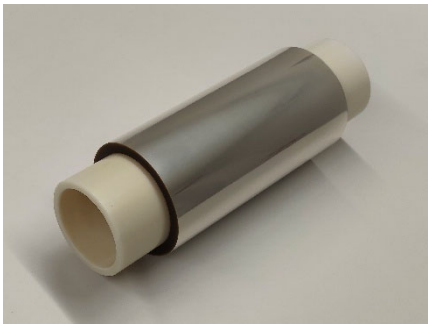
TOYOBO
Beyond Horizons

TOYOBO CO.,LTD.
Head Office
Osaka Umeda Twin Towers South,
1-13-1 Umeda, Kita-ku, Osaka 530-0001, Japan

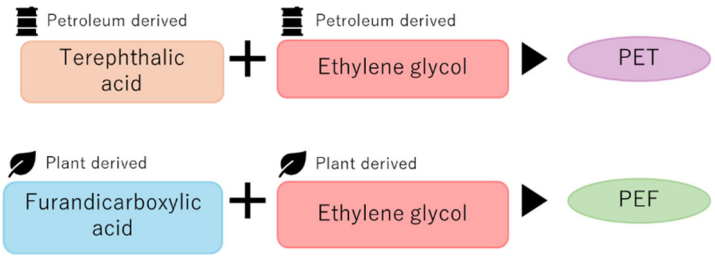
April 14, 2026

Toyobo develops industry-first*1 100% plant-based Polyethylene Furanoate (PEF) Film; Samples Available from June
With greater rigidity and better gas barrier properties than PET, the product contributes to the advanced performance of electronic devices

Toyobo Co., Ltd. has developed the industry's first*1 biaxially oriented polyethylene furanoate (PEF) film made from 100% plant-derived materials and will begin providing samples in June. Although PEF films are entirely plant-derived, they offer 60% higher rigidity*2 and ten times better oxygen gas barrier properties*3 than petroleum-derived polyethylene terephthalate (PET) films. These properties enable PEF films to enhance the reliability and functional performance of industrial components, including those used in electronic devices.



Newly developed PEF film



Differences in raw materials between PEF films and general PET films

The newly developed PEF film has one of the highest rigidity levels*1 in the industry for biaxially oriented thermoplastic resin films, despite being entirely plant-derived. In addition to the inherent bio-based nature of PEF, the company has maximized the excellent rigidity and gas barrier properties characteristic of the films by optimizing the molecular orientation and crystallization conditions of the PEF resin through its proprietary film-forming technology.

Due to its rigidity, which is 60% higher than that of PET films generally used for industrial purposes, the PEF film can be made thinner while maintaining strength and durability. By minimizing wrinkles and deformation caused by pressurization and bending, it also contributes to downsizing and reducing the weight of electronic components, making liquid crystal displays less susceptible to scratches, and enhancing the high-frequency performance of acoustic components.

Furthermore, the PEF film has a gas barrier performance for oxygen that is ten times higher and for water vapor that is twice as high as that of PET films. When used as a protective film, it suppresses the oxidation of electronic components and the ingress of moisture during transportation and use, which is expected to enhance long-term product reliability.

Toyobo plans to optimize the properties of the PEF film—particularly its excellent rigidity and gas barrier characteristics for industrial applications—in line with clients' needs, while maintaining its inherent bio-based nature as a fully plant-derived material. It aims to actively expand applications in fields such as optics, surface protection, mold release, and electronic components, as well as other industrial domains, with the goal of commercializing the product by 2035.

■ Polyethylene Furanoate (PEF)

PEF, which has a molecular structure and properties similar to PET, is a new plastic made from 100% plant-derived materials. While PET is produced from petroleum-derived terephthalic acid and ethylene glycol, PEF is manufactured entirely from plant-based furandicarboxylic acid and ethylene glycol. As a result, it is attracting significant attention as a sustainable material that contributes to carbon neutrality. PEF is expected to find wide application in films and other products due to its excellent rigidity and gas barrier properties, in addition to its inherent bio-based nature.

■ Exhibition History

The PEF film was exhibited for the first time at the Sustainable Material Expo (SUSMA), held November 12–14 at Makuhari Messe in Chiba, Japan.

*1: According to Toyobo's study in the plastic film industry as of April 14, 2026.
*2: Rigidity refers to the resistance of a material to deformation when force is applied.
*3: Gas barrier property refers to the ability to block the passage of gases such as oxygen, water vapor (moisture), carbon dioxide, and aroma components.

* This product is currently under development.

For more information, contact:
Public Relations Group, Corporate Communication Department, Toyobo Co., Ltd.
E-mail：pr_g@toyobo.jp