

**Title:** Supporting the sustainability of polyolefins developing analytical methods for recycled materials.

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**Images:**

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**Abstract:  
(Poster)**

Separation techniques, which work on dilute solutions of the polymer, for instance gel permeation chromatography (GPC) and crystallization elution fractionation (CEF), are fundamental in polyolefin research activities as well as in product control.

Development of analytical methods for recycled and recyclable materials is a required line of action for supporting the sustainability of polyolefins. There is not a clear-cut analysis which can tell whether the material is 100 % virgin or whether it has a given content of recycled resin. It depends on the level of degradation of a recycled material or how far is its microstructure from the one of virgin material.

There are, however, many clues to know about the origin of the material by direct comparison with a reference and based on the knowledge in polyolefin characterization acquired over the years.

In some cases, there may be very clear indications from a single technique like GPC-IR; in other cases, the investigation requires further analysis with other techniques like CEF/TGIC or even CRYSTAF.

Those are here illustrated with several examples for recycled PE and PP materials, with different requirements for sample preparation, filtration, and analysis by molar mass and chemical composition distribution techniques. Most important outcome of that characterization study is assessing that the recycled polyolefin microstructure (MWD, CCD...) is still appropriate to provide the required material performance in terms of macroscopic properties (mechanical, optical,...).