

## **Seminar: Waste Polyester as a Platform for Accessing Various Copolymers Through Chemical Diversification**

**Professor Louis M. Pitet, Hasselt University, Belgium**

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**Abstract:** Thermoplastic copolyesters (TPCs) are found in countless products, from cable insulation to airducts to phone cases. The wide range of applications derives from the versatile chemical makeup available to tailor the properties. Nearly all TPCs, however, have one common ingredient – polybutylene terephthalate. Terephthalates have a relatively large carbon footprint owing to the resource intensive production, and essentially all TPCs are manufactured from virgin raw materials. This continues despite the millions of tons of terephthalates discarded every year in the form of bottles and fabrics. We have developed a remarkably generic methodology for generating complex copolymer architectures directly from high molar mass PET as the primary feedstock. We combine PET with various building blocks carrying a diversity of functional groups and exhibiting wide ranging physical properties. This is done in a one-step melt process (i.e., solvent-free) to afford performance enhanced segmented copolymers. By repurposing discarded materials, we are working toward dramatic reduction in CO<sub>2</sub> output associated with this industry, and contributing to a circular plastic economy.