Tuning the Performance Properties of Foams with High Recycled Content Enabled by Dynamic Crosslinking

Kim McLoughlin, Stephen Schmidt, Jayme Kennedy, and Michelle Sing*
Braskem America, Pittsburgh, PA 15219

Foams produced from crosslinked ethylene vinyl acetate (EVA) provide a balance of processing performance, mechanical properties, and durability in technically demanding applications. Crosslinked EVA networks do not melt, flow, or dissolve to enable the use of conventional reprocessing or recycling methods. As a result, recycling crosslinked EVA waste has long posed a challenge, and most crosslinked polymers and foams accumulate as plastic waste.

We recently demonstrated technology that can transform crosslinked EVA foam waste into new polymers with thermoplastic behavior, which can be melt processed using conventional techniques including foam compression molding. Here, we show that foams containing more than 35 wt% recycled EVA foam waste can be produced by dynamic crosslinking. By blending the recycled EVA-based polymer with virgin resins and conventional foaming additives, we produced foams with tunable performance properties, including density, hardness, and compression set. These findings highlight a scalable pathway for integrating recycled foam waste into new products, supporting closed loop circularity.