Turning green: making viscoelastic foam from polycarbonate ether polyol

Together in elastic dreams

MidJourney (AI generated)

James Snodgrass reports on the partnership between Monument Chemical and Econic Technologies that is now producing versatile polyols from captured CO_2 in North America

Keith Wiggins: looking for brave souls

Don Phillips: this was a perfect fit for us

Around the time you read this, Monument Chemical will have scaled to pilot production of CO_2 containing polyols at the Brandenburg, Kentucky, plant it has owned since 2012. Monument is the first company in North America to licence Econic Technologies' process for creating polyols from CO_2.

UT caught up with Keith Wiggins, CEO of Econic, and Don Phillips, vice president and general manager (oxides) of Monument, at the Polyurethanes Technical Conference in San Antonio, Texas, in September 2023 to discuss this fruitful relationship.

Wiggins said: "Econic is effectively pioneering getting CO_2 into polymer systems. And the first market that we're targeting is polyurethane, so polyols [for] polyurethane."

Econic started life as an R&D organisation for the first 10 years of existence, Wiggins explained, focused on developing the right catalyst and identifying the right market: "2022 was the turning point of our moving from being an R&D organisation into being a commercial organisation. And the reason for that was because the market is requiring new, renewable carbon and sustainable solutions with regard to next-generation thermosets.

"Where we are now is bringing in our first licensees – those brave souls, those innovators that want to go first and get first mover advantage in their markets. And we're really delighted to be working with Don and his team at Monument in order to be able to make that happen in North America."

"Brave soul" Phillips replied: "We're focused on our core pillars of innovation and sustainability. In order to be innovative, maybe you have to be a little bit brave, looking at the future and [asking] what do you want to be when you grow up and really finding the right partners to hitch your wagon to make that happen.

"It's appealing for us to drive new products into the marketplace as Monument – and specifically the oxides division of Monument – as it really starts to transition from our base of more commodity-based chemicals more into the specialty or technology-driven chemicals. This was a perfect fit for us. And we've looked at a lot of partners and companies and technologies out there," Phillips added.

Wiggins continued: "The

Kentucky pride: Monument's Brandenburg, Kentucky plant

end product is a polycarbonate ether polyol. The CO_2 brings a carbonate linkage into the backbone of the polyol. And what that does is it brings performance benefits: the carbonate imparts properties which make coatings stronger, foams more durable, and so on and so forth. But that's all down to the art of the formulator in order to be able to get the right system to market."

An art that is already seeing results. CO_2-containing polyols were widely thought to only have applications in slabstock foam, but in February 2024, Econic announced that its technology can now be used to make premium memory foam mattresses.

Meanwhile, back in Kentucky, after a pilot, Monument is about to scale capability to "maybe a million pounds [454kT] of CO_2-based polyol", according to Phillips. He said the upcycled CO_2 waste comes from internal sources but, as they scale production, they will eventually be pulling external CO_2 waste.

Econic has announced partnerships for its technologies in territories outside North America, too, including the December 2023 joint development and technology transfer agreement with Manali in India and polyol production commencing at Changhua in China.

About the companies: based near Manchester, UK, Econic was founded in 2011 by Professor Charlotte Williams at Imperial College London to licence and sell catalyst and process technology for the manufacture of CO_2-containing polymers. Monument is an Indianapolis, US-based specialty chemicals producer and toller (custom manufacturer), with a focus on distillation and reaction technologies.