From left to right: Katharina Kaiser, Guy Buyle and Ine De Vilder were among the presenters highlighting the progress of the Decoat project at Ecomondo this year.

DECOAT BRIEF IN RIMINI

Multilayered textile materials are everywhere. You may not have noticed, but their use has been growing over the past decade – from packaging materials to clothing, automotive parts to electronics. In many ways, they're a technological marvel. But as yet, they're unrecyclable – and that's something that the European Union's Horizon 2020 project DECOAT aims to change.

By Ben Messenger

Launched in February 2019, the DECOAT project involves 17 partners from across Europe and across the value chain, including design, manufacturing, research and innovation organisations, and our very own NGO, the International Solid Waste Association (ISWA). The four-year project has been backed by €5.9 million of EU funding and aims to enable the circular use of textiles and plastic parts with (multilayer) 'coatings', which are typically not recyclable yet. These 'coatings' comprise functional and performance coatings and paints as well as adhesion layers.

Just nine months into the project, the team has a plan of attack: to use novel triggerable smart polymer material systems based on smart additives, such as microcapsules or microwave triggered additives, for the 'coating' formulations that will be activated by a specific trigger (heat, humidity, microwave, chemical) when it is time to recycle the product.

A continuously operating pilot recycling plant will demonstrate the novel DECOAT principle that allows existing mechanical recycling to be upgraded with the addition of tools for sorting and activating the relevant trigger for the given material.

EXPLANATIONS AT ECOMONDO

The recent Ecomondo event in Rimini, Italy offered the perfect opportunity for the DECOAT team to engage the wider public with an afternoon of well-attended public presentations on the ISWA stand. Guy Buyle, a research manager at project member Centexbel, kicked off proceedings by explaining the core goal of 'triggerable' coatings.

Centexbel is the Belgian scientific and technical centre for the textile and plastic converting industry and is the coordinator of the DECOAT project. As such, it will be involved in several aspects linked to the DECOAT implementation, including exploitation and communication to the wider public.

"The additives, the triggers, are chosen in such a way that they will react to an external trigger," he said. "That could be a thermal trigger delivered simply by heat or by steam, or it could also be by microwave or by chemical reaction. If this trigger is in place, then the idea is that the primer will dissolve and you can split the coating and the substrate. But this is only a small part, because the total value chain has to be in place to make it possible."

The focus is on recycling of the bulk material, but re-use of the coatings materials themselves will also be tackled. Using these recycling processes, circular use of demo cases for outdoor gear, household electronics and automotive parts will be validated. A systemic approach for delivering breakthroughs all along the value chain will be followed.

To reach this ambitious goal and to maximise the impact of the DECOAT project on the textile and plastics sector, the team has defined eight concrete key objectives:

- Development of a toolbox of triggerable materials for debonding on demand suitable for use on textiles and plastics.
- Development and design of triggerable debonding coating solutions.

- Automation of sorting according to the required trigger.
- Demonstration via use cases using the pilot recycling.
- Assessment of environmental impact and implementation of safety-by-design.
- Exploitation and business plans for the DECOAT results, including for the use cases.
- For more generic results, a thorough analysis will be carried out for wide-scope exploitation within the textile and plastics sectors.
- Dissemination and communication among relevant European communities.

CHANGE OF MINDSET NEEDED

Also presenting at Ecomondo was Ine De Vilder, a research scientist at Centexbel. She highlighted just how diverse the materials used in the coatings of the multilayered textiles can be, and the challenges that throws up when it comes to recycling. "There's PVC, acrylics, silicone, Teflon, LDPE, and so on and so on."

Because of this, she adds, these materials generally find their way into incineration at the end of their useful lives. This situation is exacerbated by a design philosophy which has led to no thought being put into what happens to these products at the end of their lives.

"They didn't consider what to do with the product later on. Can we recycle it? How do we recycle it? It's really important that we change the mindset that people not only think about the product during its lifetime, but also after its lifetime. How can we facilitate the recycling process?" —