



Sustainable Chemistry Changemakers: The Path to a More Sustainable Future

Materials In Works: From ISC3 Start-up of the Month to a Pioneer in Circular Raw Materials From Label Waste

In recognition of its contribution to Sustainable Chemistry, **Materials In Works (MIW)**, winner of the 'Best Regional Impact' award at the ISC3 Innovation Challenge 2022, was named Start-up of the Month by the International Sustainable Chemistry Collaborative Centre (ISC3) in November 2022. The Malaysian start-up was founded in 2018 by a group of passionate packaging material experts. Materials In Works has developed a technology-based solution to recover cellulose from label backing paper waste, recycle this cellulose and reuse it as a raw material for the manufacture of paper products. This innovation is a major benefit both for the environment and for companies in the paper manufacturing sector, as the price and availability of cellulose raw materials are of central importance to the industry. The next step is to scale up production capacity.

The driving forces behind Materials In Works

The idea behind Materials In Works arose against the backdrop of a growing problem: in the label packaging industry, tonnes of liner waste are generated daily as an unused by-product. This consists of silicone-coated label liner films that remain after labelling and are traditionally considered non-recyclable due to the complexity of their material composition. To date, the only disposal method in Malaysia has been landfilling. In Malaysia, approximately three kilotonnes of paper waste are sent to landfill every day. This has led to rising greenhouse gas emissions, environmental pollution and, due to the construction of further landfill sites, a shortage of land. The founders, Dr Leh Cheu Peng and John Ooi, succeeded in developing a process to recover cellulose from label backing paper waste and return it to the paper manufacturing cycle as a raw material. More than three years after receiving their award, we spoke to the two innovators about how their start-up has developed, what highlights they can point to, and how the support from the ISC3 network has contributed to their development.

What does Sustainable Chemistry mean to you?

For Materials In Works, Sustainable Chemistry means the consistent development of material systems that prevent waste, reduce dependence on primary resources and enable continuous, environmentally friendly material recovery. We view waste streams as valuable resources that must be transformed into high-quality secondary raw materials in line with the principles of a circular economy. Another key aspect for us is strengthening local circular ecosystems by processing waste as close as possible to where it is generated, reducing transport emissions and promoting regional value creation. Sustainable Chemistry makes it possible to establish a genuine circular economy for materials.

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Where do you stand today compared to when you were named Start-up of the Month?

Since then, our technology has progressed from the concept phase to practical application. We are already processing several tonnes of material per month, with a clear focus on industrial scalability. At the same time, we have further developed our processing method and established a circular ecosystem that connects label processors, logistics service providers and packaging manufacturers. Organisationally, we have grown from a founder-led R&D initiative into a structured company with technical partners, manufacturing capacity and clear marketing channels. Our team has also grown. We now have 6 employees, including experts in business administration, marketing and sales.

How have you benefited from the collaboration with ISC3 and the support provided by the ISC3 Global Start-up Service?

Being named ISC3 Start-up of the Month has given Materials In Works international visibility and credibility, positioning us as a serious innovator in the field of Sustainable Chemistry. This has been particularly significant in discussions with multinational companies. Through the ISC3 platform, we have gained access to an expanded network of stakeholders in the fields of sustainable materials, the circular economy and eco-friendly production ecosystems, extending far beyond our home market. This has accelerated discussions with potential investors.

What have been the highlights of the journey so far?

One of the most important milestones is, above all, the successful technological scaling of our solution. Another highlight is the successful production of prototypes for moulded pulp packaging made from 100 percent recovered liner waste. These achieve performance comparable to that of virgin pulp whilst enabling consistently recyclable material recovery, a decisive step towards market readiness.

What does all this mean for your company?

Today, our focus is already on further scaling up production capacities and the wider implementation of recyclable pulp solutions in South-East Asia, in order to successfully transition from pilot applications to a stable, commercial market presence. The prospect that we will soon be able to reduce our dependence on fresh wood and minimise environmental pollution, thereby making an active contribution to the protection of natural ecosystems, is a major success. Our vision is becoming reality – on a commercial scale.

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About the International Sustainable Chemistry Collaborative Centre (ISC3)

The International Sustainable Chemistry Collaborative Centre (ISC3) advances the global transition to Sustainable Chemistry across chemical value chains with cross-sectoral impact. The chemical industry is deeply interconnected with almost all areas of the economy and shapes the lives of people worldwide.

ISC3 promotes a holistic sustainability approach that embeds sustainable technologies, processes and products throughout supply chains. Products are considered across their entire life cycle – from design and production to use and further processing. This approach integrates environmental, economic and social dimensions, supports the closing of material loops within a circular economy, and fosters new efficiency- and sustainability-oriented business models. At the same time, ISC3 promotes a shift in thinking among stakeholders by advancing sufficiency strategies, helping to reduce the absolute consumption of materials, resources and energy, and encouraging solutions that are aligned with actual needs.

The Centre follows a multi-stakeholder approach, bringing together policymakers, public and private actors, industry, academia and civil society worldwide. It strengthens expertise and sustainability competencies, contributes to international chemicals policy, advises organisations, promotes innovation and entrepreneurship, and develops education and training programmes. In addition, ISC3 initiates strategic alliances to accelerate the transition to Sustainable Chemistry.

ISC3 was established in 2017 on the initiative of the German Federal Ministry for the Environment, Climate Action, Nature Conservation and Nuclear Safety (BMUKN) and the German Environment Agency (UBA). The Centre is hosted by the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH and supported by DECHEMA (Society for Chemical Engineering and Biotechnology) as the ISC3 Innovation Hub. www.isc3.org