

TECH OFFER

Green Plastics from Carbon Dioxide and Renewable Feedstock



KEY INFORMATION

TECHNOLOGY CATEGORY:

Sustainability - Low Carbon Economy

Chemicals - Polymers

Materials - Plastics & Elastomers

TECHNOLOGY READINESS LEVEL (TRL): **TRL4**

COUNTRY: **SINGAPORE**

ID NUMBER: **TO174734**

OVERVIEW

To date, the current primary feedstock for plastic production is oil, which accounts for more than 850 million metric tons of greenhouse gases emissions per year. Hence, there has been an increasing demand for green plastics, which are plastic materials produced from renewable sources.

This technology offer is a synthesis method of green plastics from carbon dioxide (CO₂) and renewable feedstock. The green plastics produced are non-isocyanate polyurethanes (NIPUs) and can be actively tuned to be anionic, cationic, oil-soluble and cross-linkable which enables a wide range of applications. These NIPUs are non-skin irritant, have high bio-content and can possibly be made to be bio-degradable.

This technology owner is looking for partners in various industries such as personal and consumer care, coatings and lubricant additives (to name a few) for further co-development of the solution. The technology owner is keen to license this technology as

well.

TECHNOLOGY FEATURES & SPECIFICATIONS

This technology offer is a synthesis process of making green plastics from CO₂ and other renewable feedstock. The technical features & specifications are as follows:

- Non-isocyanate polyurethanes (NIPUs)
- Mild synthesis conditions
- CO₂ and renewable feedstock
- Tuneable properties (film forming, adhesion, emulsion stabilisation, anti-redeposition, reversible cross-linking, wax inhibition and pour point depression)
- Non-skin irritant
- High bio-content (possible to be bio-degradable)

POTENTIAL APPLICATIONS

This technology is applicable for those looking for green plastics. The potential applications are:

- Coatings (self-healable coatings and adhesives)
- Consumer and personal care products (oil-based film formers, pigment dispersions, wax inhibitors)
- Lubricant additives

MARKET TRENDS & OPPORTUNITIES

In the Industry there is a trend towards the avoidance of toxic chemicals such as isocyanates and phosgene in the production processes. Incorporation of renewable feedstock, CO₂ and having higher bio-content in the final product and tuneable functionality will be added advantages to capture market opportunities.

UNIQUE VALUE PROPOSITION

- Use CO₂ and renewable feedstocks (decarbonisation and sustainability)
- Mild manufacturing conditions
- Higher bio-content for possible biodegradation
- Superior and tuneable properties