

## Request for Industrial Partners (25 October 2022)

**Project title:** Dissolution recycling, rejuvenation and reuse of PVC waste in vinyl floorings

**Acronym:** DISSOLV

Project ID	
Type	ICON
Period	2 years
Starting date	TBD
Total project budget	TBD
Subsidy percentage	according to SBO and O&O regulations
Current industrial partners	confidential
Catalisti contact	Stef Koelewijn ( <a href="mailto:skoelewijn@catalisti.be">skoelewijn@catalisti.be</a> ) Kathleen Smolders ( <a href="mailto:ksmolders@catalisti.be">ksmolders@catalisti.be</a> )

### Project description

#### Introduction

EU legislation sets mandatory recycling rates (50% and 55% by 2025 and 2030, respectively) and plans to include a mandatory recycled content target (30% by 2030) for plastic packaging to create a more sustainable circular economy in Europe [European Commission]. Flemish legislation pushes towards a more circular use of plastics as well [Vlarema 8]. While plastic waste streams hold an enormous recycling potential, currently, only a minor fraction of plastic waste is valorized. In 2020, less than 40% of the post-consumer plastic waste in Belgium was sent to recycling while almost 60% was incinerated for energy recovery [PlasticsEurope, 2022].

Since there is no “silver bullet” solution to significantly reduce waste disposal and GHG emissions, upstream (i.e. pre-consumer) and downstream (i.e. post-consumer) solutions are complementary and are most effective when deployed together [Systemiq, 2022]. Dissolution recycling, among others, is expected to become an enabling downstream technology to increase the recycling rate of numerous plastic waste streams and to further close the loop. In particular, dissolution recycling can ameliorate some of the inherent negative characteristics of mechanical recycling, such as polymer degradation and product quality and purity.

So-called “legacy additives” include previously used hazardous chemicals (e.g., plasticizers, fire retardants) that are now declared as “substances of very high concern” (SVHCs) [ECHA] or as “persistent organic pollutants” (POPs) [UN Stockholm Convention]. The hazard posed by SVHCs/POPs is being addressed by strict international regulations such as EU REACH. These regulations aim to phase out and prevent the recirculation of SVHCs/POPs in commercial trade to protect human health and environment from further contamination. Accordingly, plastics that contain SVHCs/POPs should be phased out and destroyed or, alternatively, remediated.

In short, driven by sustainability, a clear need exist to develop innovative downstream technology that can efficiently recycle plastic waste while safely dealing with legacy additives, which is crucial to establish a truly sustainable circular economy of plastics. In this regard, dissolution recycling seems to be a promising technology.

#### Goals

In general, the DISSOLV project attempts to rejuvenate and recycle, and reuse PVC waste streams in cushion vinyl flooring applications by dissolution technology. More specifically, the proposed project aims to increase the recycled content in cushion vinyl flooring by replacing one or more virgin constituents with recycled alternative(s) that are devoid of harmful legacy components. Cushion vinyl flooring mainly

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consists of PVC, plasticizers and filler material but also minor amounts of additives and glass and/or polyester (backing) are present. PVC waste streams can originate from end-of-life flooring as well as other PVC waste (e.g., tarpaulins, artificial leather, medical devices).

Innovative dissolution technology will be developed that is capable to treat selected PVC waste streams, to extract recyclable constituents and to separate harmful legacy additives and other constituents (e.g. DEHP, organo-Sn, Pb, Zn, Cd and Ba salts). Since the composition is extremely important to achieve the desired properties of cushion vinyl flooring, the effect of different plasticized PVC waste streams will also be evaluated. Separation and purification of recovered valuable plasticizer will also be an important task within the project.

Tentative project outline:

- Part 1: Identification and characterization of PVC waste streams using advanced analytical techniques (e.g. FTIR, GPC, ICP-AES, XRF, etc.)
- Part 2: Selective dissolution recycling of PVC waste streams into valuable recyclable constituents
  - Pre-treatment: cleaning, grinding, and mixing
  - Treatment: dissolution, filtration, precipitation, distillation and drying
- Part 3: Advanced separation of all components of PVC waste streams
  - Separate PVC in a usable physical form
  - Separate plasticizer in a usable physical form
  - Separate, purify and/or post-treat (legacy) additives
- Part 4: Recyclate(s) reuse and evaluation in vinyl flooring applications.

The proposed project contributes to establish a sustainable closed-loop recycling of cushion vinyl floorings.

### Request

**To complete the consortium, Catalisti is searching for additional industrial partners** with expertise, technology or knowledge in the following domains:

- Supplier(s) of flexible PVC waste streams, e.g., tarpaulins, artificial leather, medical devices, wire and cables insulation.
- Lab- and/or pilot-scale equipment/technology to purify and post-treat recyclable constituents, e.g. plasticizers, fillers, etc.
- Knowledge and expertise on re-additivation of PVC.
- Knowledge and expertise on analytical techniques and polymer architecture.

Companies preferably possess strong market intelligence and application development know-how in their respective field. Each company in the consortium will be given its own exclusive “field of interest” to make the consortium synergistic, risk-mitigating and non-(intra)-competitive.

The list of tasks, however, is not limiting, other relevant expertise and/or potential applications can also be offered.

### How to reply to this request

Please send an email **at the latest by November 15** to Stef Koelewijn ([skoelewijn@catalisti.be](mailto:skoelewijn@catalisti.be)) with Kathleen Smolders ([ksmolders@catalisti.be](mailto:ksmolders@catalisti.be)) in CC, and **briefly describe your interest and potential contribution** to the project. Based on all offers, the current industrial partners will determine together with Catalisti which partners can join the consortium. After submission of your offer, you can be contacted by phone to further elaborate your offer. The partner decision will be communicated on November 29 at the latest.

*Important notice: Partners that wish to participate in Catalisti-supported projects are required to be member of Catalisti. For more information on membership and membership fees, please visit our [website](#) or contact Stef Koelewijn ([skoelewijn@catalisti.be](mailto:skoelewijn@catalisti.be)).*

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**Contact**

Please contact Stef Koelewijn ([skoelewijn@catalisti.be](mailto:skoelewijn@catalisti.be), +32 487 67 20 77) if you have questions concerning this RfP.

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