

Enhancing uPVC recycling

Ending Plastic Waste Mission

Qamar Schuyler¹, David Abbott², Jack Fitzgerald³, Shenghong Li⁴, Sophi Macmillan⁵, Aaron Seeber², Melissa Skidmore², Andrea Wilde²

¹CSIRO Oceans and Atmosphere, ²CSIRO Manufacturing, ³Think Fencing, ⁴CSIRO Data61, ⁵Vinyl Council of Australia

CSIRO is working with partners in the PVC industry to measure and classify critical characteristics of unplasticised PVC recyclate, and improve the efficiency of converting the material into other products.

Project Background

Polyvinyl chloride (PVC) is one of the more commonly produced polymers but is challenging to recycle due to the wide variety of additives and stabilisers used in production.

To address this problem, CSIRO has partnered with industry partner Think Fencing, and peak body the Vinyl Council of Australia (VCA), supported by grant from Sustainability Victoria. The project has two main aims.



Figure 1: Sources of recycled PVC. Photo credits: the Vinyl Council of Australia.

Aim 1: Develop material specifications

We will hold a workshop with uPVC (unplasticised or rigid PVC) compounders and manufacturers to identify and agree on material specifications relevant to recycling rigid PVC. Specifications will facilitate the use and uptake of recycled PVC by both compounders and manufacturers, by improving quality assurance of the composition of the product and/or feedstock.



Figure 2: Examples of products created with recycled PVC: (l-r) garden hose, decking, flexible conduit. Photo credits: the Vinyl Council of Australia (1,3) and Think Fencing (2).

Aim 2: Quantify critical characteristics of PVC recyclate

We will create a systematic process and associated analytical tools that fulfill two functions:

- Identify and classify critical characteristics of a sample of PVC recyclate (heat stabiliser, filler, lubricant, impact modifier)
- Determine appropriate modifiers to add to the recyclate to produce a feedstock material ready for manufacturing that meets desired output specifications.

The process is intended to systematise the “art” of PVC recycling, and create a standardised set of measurements that can be applied by recyclers or manufacturers to grade the quality of the PVC recyclate that they are providing or receiving. It is intended to be easily operable in an industrial setting, so that the sample does not require laboratory analysis.

In conjunction with technology that has already been developed by our partner Think Fencing, this new process will allow manufacturers and compounders to incorporate PVC blends from a wide variety of sources of pre- and post-consumer waste, and process those blends into PVC flakes that meet material specifications. This will vastly increase the amount of PVC that can be recycled.



Figure 3: PVC manufacturing process. Photo credits: Think Fencing

We aim to develop a set of standards that can be used to classify and categorise recycled PVC. These standards will then be used worldwide to create a benchmark for all recycled PVC. With standards, recycled PVC will be seen as a usable raw material as the specifications of the PVC will be known, changing the way in common PVC recycling practices.

We are working on a world first analyser that can autonomously alter the state of recycled PVC by the addition of additives such as heat stabiliser to fit these standards

If you would like to provide feedback from an industry perspective, or be involved in the project, please contact us at the email address below.

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FOR FURTHER INFORMATION

Qamar Schuyler
Oceans and Atmosphere
Qamar.Schuyler@csiro.au
<https://research.csiro.au/ending-plastic-waste/>

