Plastics upcycling with
Hydrochemolytic™ Technology

ADURO
CLEAN TECHNOLOGIES

Chemical recycling of **crosslinked polymers**

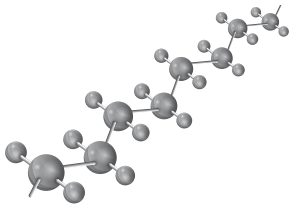
The **Between** Chemistry.

Strong and durable

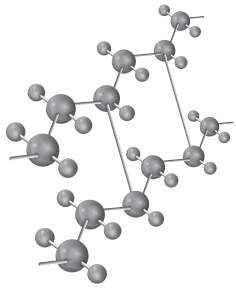
Plastics have diverse chemical structures. **Crosslinked polymers are a class of polymer where the polymer chains are interconnected to form a strong, three-dimensional network.**

Specialty plastics such as crosslinked polyethylene (PEX) are designed to be tough and durable.

Polyethylene (PE)



Crosslinked Polyethylene (PEX)



Because of the crosslinking, PEX is strong and highly stable, making it resistant to heat, mechanical stress, and solvents. It therefore is highly beneficial in applications where strength and performance at elevated temperatures are important, for example, in water pipes and roofing films, which are crucial to sustaining modern societies.

Challenges in recycling

The interconnected structure that makes certain crosslinked polymers highly stable and durable also makes them notoriously problematic for traditional recycling techniques. Consequently, most crosslinked polymers end up in landfills or are incinerated.

Not anymore!

Processing such complex plastics is the competitive edge of our innovative chemical recycling technology platform. We can take polyethylene (PE) – conventional or crosslinked – and transform it into a value-added product, a mixture of substantially saturated hydrocarbons that are suitable as feedstocks for naphtha-crackers and specialty chemicals such as paraffin wax.

Features of Hydrochemolytic Technology

Sustainability
Unlike pyrolysis, the milder conditions of HCT mean lower CO_2 output and minimal loss of carbon input. This reduces greenhouse gas emissions and environmental strain.

Flexibility
Due to its unique chemistry and process, HCT can process stubborn plastic waste like PEX to yield high quantities of high quality products.

Versatility
HCT can handle plastics contaminated with diverse components including PET and multi-layer materials, maximizing plastic resource recovery from difficult-to-recycle mixed waste and reducing dependence on virgin fossil resources.

The perfect balance **between** economic and environmental benefits

Superior yield
Higher return on investment with plastics resource capture 85+%

Minimal post processing
Generates valuable hydrocarbons with very low unsaturation

Tolerance for contaminants
Lower costs for pre-processing of plastic feedstocks

Lower emissions
As little as 5% feedstock loss to methane and CO_2

Energy efficiency
Lower temperatures than conventional techniques such as pyrolysis

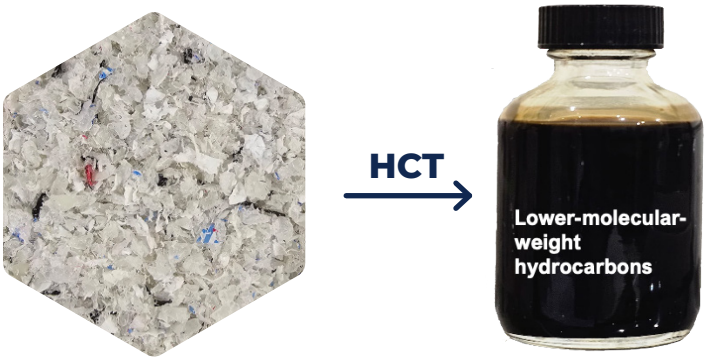
Supports circularity
High quality feedstocks for the circular economy

Environmental and economic impact

The market for durable plastics is expanding, with around 2.5 million metric tons of crosslinked polyethylene (PEX) produced annually, making it a $6.4 billion industry. This industry is projected to grow at a compound annual growth rate (CAGR) of 6.5%, reaching $8.7 billion by 2028.[1]

Aduro Clean Technologies tested its unique chemical recycling technology on PEX samples and achieved results similar to those for conventional PE. The 85+% yield of lower molecular-weight hydrocarbons, primarily in the C8-C28 range, further establishes the technology's capability to recycle complex polymers into valuable hydrocarbons.

This success not only strengthens Aduro's entry into the building materials sector but also opens up large markets for the recycling of crosslinked polymers.



PEX **Upcycled Product**

1. https://www.mordorintelligence.com/industry-reports/cross-linked-polyethylene-xlpe-market

Future Prospects

Aduro continuously advances its knowledge to enhance the efficiency and broaden the applicability of Hydrochemolytic Technology.

The company is collaborating with industry partners to implement its technology in real-world recycling processes, aiming to transform the landscape of polymer recycling.

The Aduro innovative approach to recycling crosslinked polymers represents a significant advancement in addressing one of the most challenging aspects of plastic waste management. Through its Hydrochemolytic Technology, Aduro is paving the way for a sustainable and circular economy, transforming difficult-to-recycle materials into valuable resources and reducing the environmental footprint of plastic waste.

Aduro Clean Technologies is the **between** that connects the benefits of modern life with an environmentally sustainable future.

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