

Specialty materials for sustainable and competitive hydrogen mobility.

Arkema intends to become the benchmark "materials" partner for hydrogen mobility systems. The underlying technical challenges to be met for the deployment of hydrogen as an energy solution are at the core of Arkema polymers developments: high performance, added value and sustainability.

4 axis aiming at developing and pushing to the market disruptive technologies in the field of Hydrogen as a fuel for mobility are contemplated.

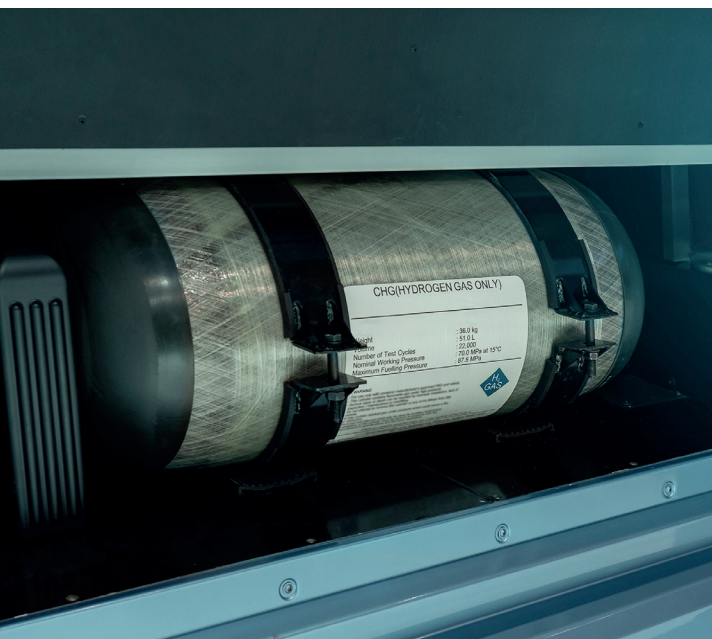
Hydrogen tank liners and hoses

Rilsan® Polyamide 11 is recognized as one of the most suitable advanced materials for producing hydrogen tank liners and hydrogen hoses. As a highly processable and durable material, PA11 can be used in most hydrogen applications, including 700 bar pressure tanks. Thanks to two of its intrinsic performance pillars, its very high hydrogen barrier properties and its excellent low temperature impact resistance, liner based on Rilsan® PA11 has successfully passed the GB/T 42610 2023 certification in China.

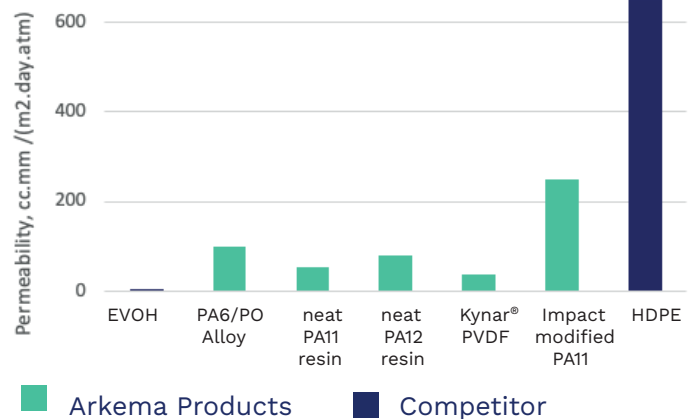
In addition, Rilsan® PA11 offers excellent welding properties, requires less drying than short chain polyamides, and can be processed into Type IV tank liners through rotomolding, extrusion blow molding, and standard extrusion.

Rilsan® PA11:

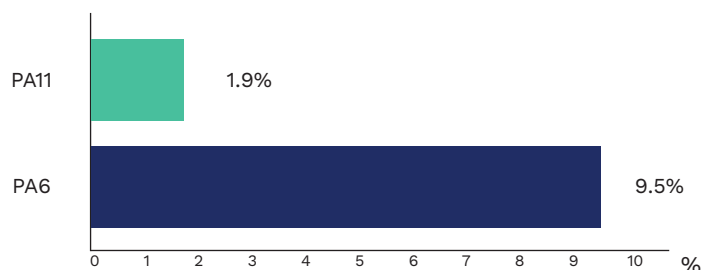
- Excellent hydrogen barrier properties
- Unmatched cold temperature ductility
- Highly Processable + Weldable
- Excellent resistance to blistering
- Biobased + recyclable



H₂ Permeation Performance of Various Polymers



Moisture Uptake at Saturation





THERMOPLASTIC COMPOSITE TYPE IV HIGH PRESSURE HYDROGEN TANKS

Elium® UV curable thermoplastic composite and Rilsan® polyamide 11 liners

Main Benefits :

- Performance: weight and material saving thanks to higher ductility and low permeability
- Productivity: suppression of traditional thermoset curing steps and fast photo-polymerisation
- Recyclable: Elium® can be depolymerised allowing circular economy
- Bio-based: Rilsan® PA 11 is synthesized from castor oil

THERMOPLASTIC COMPOSITE TAPES FOR TYPE V EXTREME TEMPERATURES HYDROGEN TANKS

Rilsan®Matrix polyphthalamide thermoplastic composite UDX® tapes

Main Benefits:

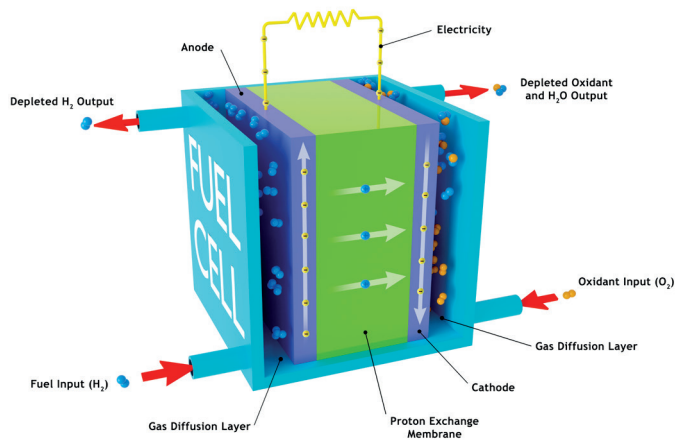
- Performance: material performance above 100°C, weight and material savings
- Productivity: suppression of liner production step
- Versatility: other high-performance polymers for cryogenic, electrolyser or conformable tanks
- Recyclability: thermoplastic recyclable composites

THERMOPLASTIC RESIN COMPOSITES

Fuel Cell Components

Bipolar Plates, MEA, GDL & Seals

Arkema's Kynar® PVDF is a highly pure, chemically resistant, high temperature polymer that can be considered for use in many applications. In a PEM fuel cell, Kynar® PVDF is used as a binder for graphite composite bipolar plates. It is also used to seal the layers within the stack. Kynar® PVDF is also an excellent material for developing efficient Proton Exchange Membranes.



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