FÁBRICA CARIOCA
DE CATALISADORES

CYCLUS

Catalyzing Sustainable Solutions

Cyclus

A Catalyst designed for the urban solid wastes chemical recycling

In the last decades, the use of natural resources and the generation of wastes is on the growth in a continuous way, arising concern on environmental impacts. It is more and more evident that in the long run the present prevalent economic model is not sustainable.

Aiming at the transformation of the linear economy towards a circular model the development and application of sustainable practices in productive processes and value chain are relevant and necessary, in the search of solutions to maximize the use of resources and minimize waste generation to cause less impact on the environment.

In the search for innovative solutions that could contribute to the circular economy and for sustainability, Fábrica Carioca de Catalisadores developed **Cyclus**, a chemical recycling pioneer catalyst designed for transforming useless tires into chemical products that can be used in several socially beneficial products.

Circular Economy

Lately, the circular economy model is gaining space with the rise in the awareness on the importance of limiting the excessive exploration of natural resources and the high accumulation of waste.

This model is based on waste and pollution elimination from the beginning, on the regeneration of natural systems and on the extended life cycle of products and materials by replacing the concept of end of useful life of the linear economy by new circular flows, in an integrated process. This model requires substantial changes in terms of technology and, mainly, behavior.

Tire Recycling

Tires comprise natural rubber, synthetic rubber, carbon black and additives, consisting of long polymer chains crosslinked and vulcanized by sulfur links. Useless tires can be recycled by chemical and mechanical processes.

Among the chemical recycling processes, the pyrolysis process should be highlighted. It occurs at temperatures in the range of 500°C in the absence of oxygen and converts rubber into sources of raw materials for the chemical industry, including nafta and aromatic products such as benzene, toluene and xylene and fuel gas.

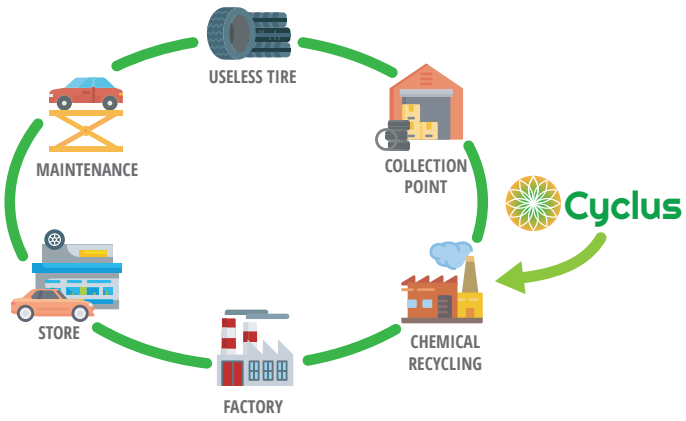


Figure 1: Tire Recycling.

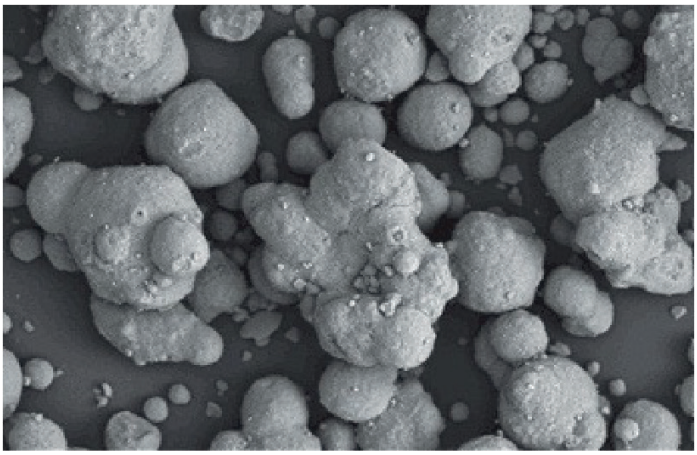
The Cyclus Catalyst

This catalyst is designed for the chemical recycling of urban solid wastes (rubber, plastics, etc.) through one-shot pyrolysis processes. This process aims at transforming these residues into higher addedvalue products to enable their reinsertion into the value chain.

Cyclus is included in the Circular Economy concept, increasing the efficiency of the transformation models aiming at inserting products at the end of their useful life into higher value chain levels of utilization.

The Cyclus catalyst was designed for processing rubber solid waste in any kind of reactor, either continuous or batch.

The catalyst is a multicomponent system of active phases, developed to exhibit high selectivity to liquid products, minimizing gas formation. Furthermore, it favors reduced reaction temperature, leading to energy gains in the process.



CYCLUS: selectivity to liquid chemical products during the chemical recycling process of useless tires chips

Thanks to its high accessibility and pore structure, Cyclus has proven its ability to convert useless tires chips into gasoline, kerosene and diesel oil range liquid fuels, fuel gas and further, recover carbon black, which returns to the rubber artifacts industry.

The application of catalysts like Cyclus to a rubber solid waste pyrolysis process results in benefits in terms of conversion, selectivity and reduced temperature reaction.

Benefits of CYCLUS

CYCLUS provides the following advantages:

- High selectivity to liquid products during the urban solid waste chemical recycling process;;
- High accessibility;
- Minimization of gas formation;
- Reaction temperature reduction, leading to energetic gain in the pyrolysis process.

FÁBRICA CARIOCA DE CATALISADORES

For more information, contact the FCC S.A. Technical Services team

ABOUT FCC S.A.

FCC S.A is a leading-edge technology company, with headquarters in Rio de Janeiro, comprising the Petrobras S.A. and Albemarle Corporation companies. Being the sole manufacturer of catalytic cracking catalysts and additives for petroleum refining in the South-American market, its consumer customers are the refineries of the Petrobras Systems, as well as the petroleum refineries of South-American countries.

Rua Nelson da Silva, 663 | Distrito Industrial de Santa Cruz | CEP: 23565-160 - Rio de Janeiro - RJ - Brasil | www.fccsa.com.br