...OUR SOLUTION: iCycle®

Thermo-chemical Separation

In order to recycle such materials, Fraunhofer UMSICHT developed the iCycle® process. The thermo-chemical process gently desintegrates composite materials for a separation of contained metals or fibers without any oxidation. At once, gaseous and liquid fuels can be produced.
While such fuels can be used not only to heat the process, but also to produce electrical power and heat, separated metals and fibers can be sold to high-grade recycling.

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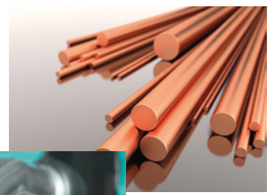

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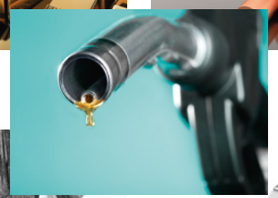

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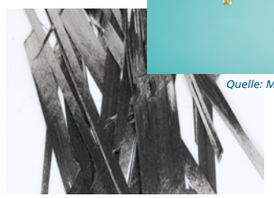

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iCycle®
intelligent composite recycling

Fraunhofer UMSICHT

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iCycle®

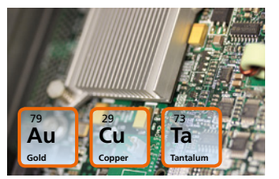
RECYCLING OF COMPOSITE MATERIALS

iCycle®
intelligent composite recycling

YOUR CHALLENGE...

Recycling of Composite Materials

Composite materials such as electrical and electronic equipment, solar panels, vehicles or fiber reinforced plastics like GFRP and CFRP contain many valuable resources. However, at the products end-of-life state of the art technologies are able to economically recycle just a limited number of contained metals, fibers, and further raw materials.



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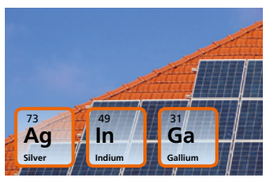

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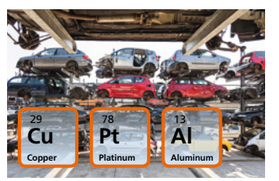

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FROM WASTE…

…TO HIGH-TECH MATERIALS

The iCycle® process

The iCycle® process is a thermo-chemical technology able to separate many different materials. In the process, plastics and further organic materials are thermally decomposed in an oxygen-free atmosphere. Thus, not only contained metals and fibers are gently disintegrated, but also high-calorific fuels can be gained as oil and gas. The iCycle® process is able to fully separate and eliminate pollutants such as halogens or dioxins in order to win products of a unique quality.

Example: Treatment of Shredder Residues

One of the iCycle® technologies major fields of application is the treatment of shredder residues, which are generated during the mechanical processing of end-of-life vehicles or electrical and electronic equipment. Although they still contain many valuable metals and energy, commonly, such residues are treated inferior in combustion plants or are even landfilled. For operators, the iCycle® process enables a production of a metal concentrate, which can be sold directly to metal recycling plants such as smelters. Gaseous and liquid fuels, produced with the iCycle® process, can be used energetically not only to deliver energy for the process, but also for further applications in the form of heat and electric power.

Demonstrator: iCycle®-70

Research and further developments at Fraunhofer UMSICHT

The experts of Fraunhofer UMSICHT at Sulzbach-Rosenberg have iCycle® systems available from pilot (0.5 kg/h) to industrial scale (70 kg/h). Additionally, the researchers infrastructure comprises further corresponding equipment for up- and downstream preparation of feedstock and products as well as analytical equipment for meaningful results.

Actually, the team of the department recycling management enhances the iCycle® process in order to enable an economic recovery of supply-critical metals (e.g. indium, tantalum, titanium, platinum group metals). For this, corresponding metals are extracted using vapor phase mobilization and subsequent recycling. Moreover, the researchers strike new paths in the developments of recycling technologies for high-grade plastic recycling.