

Recycling Automotive Scrap

Today's automobiles contain more plastic and less metal than older cars. This trend could mean more waste for landfills as newer vehicles age — unless scrap materials are recycled. Approximately 12 million automobiles are scrapped, disassembled, and shredded each year in the U.S., and about the same number are scrapped overseas. Metal is recovered for reuse. The remaining nonmetallic portion, called automobile shredder residue (ASR), is generally hauled to landfills for disposal — even though it contains recyclable materials.

Reclaiming Polyurethane Foam from Shredder Residue

Argonne National Laboratory developed new technologies for separating flexible polyurethane foam (PUF) from ASR and for cleaning it to produce high-quality foam that can be used to make new products. The PUF, which makes up more than 30% of the ASR volume, contains impurities such as automotive fluids, iron oxide, glass, dirt, and metals. Salyp NV, a licensee of this technology, is presently installing the first commercial-scale demonstration unit in Belgium. The recovered foam meets performance criteria for carpet padding and automotive applications. The Argonne technology received the prestigious R&D 100 Award in 2000.

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Argonne's froth flotation technology results in a high-quality ABS material that can be used to manufacture products such as the automotive lighting parts shown at right.

Sorting Plastics with Froth Flotation

Argonne's "froth flotation" process separates individual high-purity plastics from waste streams containing a mixture of plastics, including plastics that have overlapping densities such as (1) acrylonitrile-butadienestyrene (ABS) and high-impact polystyrene (HIPS). Argonne's process to recover plastics from mixed plastics scrap was a finalist in the Discover Award competition in 2000. Froth flotation is highly selective, producing products of greater than 98% purity and typically recovering more than 80% of a targeted material. The process is currently undergoing evaluation and demonstration to recover plastics from shredder residue as part of a Cooperative Research and Development Agreement (CRADA) between Argonne, USCAR's Vehicle Recycling Partnership (representing DaimlerChrysler, Ford, and General Motors), and the American Plastics Council.

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Dezincing Galvanized Metallic Scrap

Up to half of the steel produced in the United States contains remelted scrap metal, including galvanized steel scrap from automobiles and appliances (galvanized scrap has increased 500% since 1980). Argonne researchers have developed a new process that converts galvanized steel scrap from stamping plant wastes into clean scrap for steelmaking and recovers the zinc for resale. Meretec Corporation has exclusive rights to the technology and is now pursuing commercial deployment.

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