

RECYCLING AUTOMOTIVE SCRAP



Today's automobiles contain more plastic and less metal than ever. The metal from junked vehicles is easily recovered for reuse, but the remaining materials, called shredder residue, is creating new challenges for the vehicle recycling industry. Argonne National Laboratory is meeting these challenges head-on with innovative, award-winning solutions. With its on-site recycling pilot plant, Argonne is able to test actual materials, benchmark technologies, and demonstrate working facilities to potential sponsors.

WHAT IS ARGONNE DOING?

Reclaiming Polyurethane Foam from Shredder Residue

OPPORTUNITY: Polyurethane foam (PUF) makes up more than 30 percent of the shredder residue volume but less than 5 percent of its weight. PUF contains impurities such as automotive fluids, iron oxide, glass, dirt, and metals.

SOLUTION: Argonne has developed technologies for separating PUF from shredder residue, and for cleaning it to produce high-quality foam that can be used to make new products. The recovered foam meets performance criteria for carpet padding and automotive applications.

OUTCOME: Argonne received a prestigious R&D 100 Award for the development of this technology. The first commercial-scale demonstration unit was installed at Salyp NV, a licensee of the technology, in Belgium.

Sorting Plastics from Waste Streams by Froth Floatation

OPPORTUNITY: Shredder residue contains about two dozen plastics. Many of these plastics are not compatible with each other, and some have overlapping densities such as acrylonitrile-butadienestyrene (ABS) and high-impact polystyrene (HIPS). Existing sink/float technologies do not effectively separate plastics of equivalent densities.

SOLUTION: Argonne's "froth floatation" process separates individual plastics from waste streams containing a mixture of plastics. Froth floatation is highly selective, producing products of greater than 98 percent purity and typically recovering more than 80 percent of a targeted material.

OUTCOME: Argonne's process to recover plastics from mixed plastics scrap was a finalist in the Discover Award competition. The project was partly supported by a Cooperative Research and Development Agreement (CRADA) between Argonne, the United States Council for Automotive Research's Vehicle Recycling Partnership LLC (representing DaimlerChrysler, Ford, and General Motors) and the American Chemistry Council – Plastics Division. The froth floatation process has been successfully demonstrated in the field, and at Argonne's pilot plant.

Dezincing Galvanized Metallic Scrap

OPPORTUNITY: Galvanized scrap use has increased 500 percent since 1980. About half of the steel produced in the U.S. contains re-melted scrap metal, which includes galvanized steel scrap from automobiles and appliances.

SOLUTION: Argonne researchers have developed a new process that converts galvanized steel scrap from stamping plant waste into clean scrap for steelmaking, and recovers the zinc for resale.

OUTCOME: Through a licensing agreement with Argonne, Meretec Corporation has exclusive rights to the technology and is now pursuing commercial deployment.