

Recycling of coated light metals

Particularly from aluminum cans, construction material, or similar

Invention

Much of Europe has a circular economy in which most metallic materials, such as various construction materials and beverage cans made of aluminum, are recycled. Fundamentally, two different forms of aluminum is used in industry. Manufacturing primary aluminum requires a great deal of energy. Secondary aluminum is the metal consisting of recycled aluminum, which requires much less energy to produce. It is becoming increasingly popular in industry. During aluminum recycling of such items as beverage cans, coatings



Process for recycling aluminum cans

are usually volatilized or burned off with hot gases. The aluminum scrap is then melted down and cast. The previous process involves significant material losses. There are also several disadvantages with respect to resource-efficiency and energy-efficiency.

So Paderborn University has developed an improved recycling process that requires fewer resources and less energy. It also has higher recycled aluminum yield. It involves a combined cleaning process that removes coatings mechanically and chemically. Suitable inhibitors prevent an oxide layer from forming. A solid-state recycling process is used for further processing.

Commercial Opportunities

Current global challenges and the focus on sustainable processes prompt efficient use of existing resources and continuous process improvement with an eye to energy efficiency. The process is generally suitable for recycling coated light metals. It requires about 50% less energy than the smelting process so far used and has a much higher yield. There are thus great advantages and clear cost savings.

Current Status

Initial experiments have confirmed technical feasibility. Additional studies are being prepared. The process is being refined in a project. A German patent application has been submitted, and international applications have been planned. At the behest of Paderborn University, PROVendis offers interested companies licenses to the invention and the opportunity for cooperation and process refinement.

Current Status

Borgert T.: Reibungsinduzierter Prozess zum nutzerindividuellen und energieeffizienten Recycling von Aluminiumschrotten. [Dissertation 2023.](#)

Vieth P., Borgert T., Homberg W., Grundmeier G.: Assessment of mechanical and optical properties of Al 6060 alloy particles by removal of contaminants. Advanced Engineering Materials. [Published online 2022.](#)

An invention of Paderborn University.

Competitive Advantages

- Resource conservation
- 50% lower energy requirements
- Higher yield
- Avoids salt slag
- Can be directly processed further

Technology Readiness Level

123456789

Technology validated in relevant environment

Industries

- Aluminum recycling
- Beverage can recycling
- Construction material recycling
- Wire manufacture with recycled aluminum

Ref. No.

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