Abstract

[Project Information]

Project Title :	Effective Treatment of Composite Materials and Recovery of Resin by High-voltage Pulse Liberation
Project Number :	JPMEERF20233M01
Project Period (FY) :	2023-2024
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Keywords :	High-voltage Pulse Liberation, Composite materials, Mutual separation, Laminated glass, and Flexible panels

[Abstract]

Combination of high-voltage pulse crushing with separation techniques was investigated for efficient recovery of materials from laminated glass and flexible panels. Laminated glass and flexible panel samples were collected and analyzed to determine their structures and compositions. High-voltage pulse crushing experiments were performed by varying the sample type and size, number of pulses, distance between and voltage across the electrodes, and crushing conditions. The results from high-voltage pulse crushing were compared with those of conventional crushing methods using a ball mill and hammer mill. The power consumption for high-voltage pulse crushing was low. For the laminated glass, high-voltage pulse crushing effectively liberated glass from the resin interlayer with less than 1% of the glass (by mass) retained on the interlayer. Subsequent treatment by ultrasonication was effective for further reducing the percentage of glass retained on the interlayer. High recovery rates of > 90% (mass fraction) were achieved for both the glass and resin interlayer. For flexible panels, the two resin layers were effectively liberated by high-voltage pulse crushing. Any metals remaining on the surface of the resin were then removed by acid treatment. The combined treatment had a resin recovery rate of > 99.7% (mass fraction). Comprehensive processing and resources recovery flows are proposed.

This research was performed by the Environment Research and Technology Development Fund (JPMEERF20233M01) of the Environmental Restoration and Conservation Agency provided by Ministry of the Environment of Japan.