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SEPARATION PROCESS OF PLASTIC AND METAL FROM CD-R USING PULSED POWER

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We are investigating a new method to recycle metal and plastic from metal-coated plastics used as components of automobiles and electronics using pulsed power. In this study, we used CD-R as an example and investigated the separation of metal (silver layer) and plastic (polycarbonate basis) from CD-R using pulsed power. The pulse power from a magnetic pulse compression generator having the maximum storage energy of 40 J/pulse was applied to the gap between two ring electrodes on CD-R. The progress of the removal of metal layer and the state of discharge are observed every time of pulsed voltage application.

As a result, almost all of the silver layer was separated from polycarbonate basis by the 25 shots of pulsed power having storage energy of 35.3 J/pulse. In addition, the discharge was observed in every shot.

The light emission from the discharge at the first shot was measured using a spectroscope. As a result, spectrum related to silver was observed. It means that the discharge occurs between the ring electrodes and the silver layer and the protection layer of insulation material was punctured.

In the second and the following shots, one or two peaks were observed in the voltage waveform. The value of the first peak in the second and the following shots increased with the number of shot. As shot number increases, metal layer around the ring electrode is removed gradually and the gap length between the ring electrode and the exposed silver layer also increases gradually. Therefore, the value of the first peak in the second and following shots is supposed to correspond to the discharge onset voltages in air gap between the ring electrodes and the exposed silver layer.

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