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# Metal Removal Mechanism from Optical Discs Using Pulsed Power

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The phenomenon of metal removal from optical discs using pulsed power has been investigated. Pulsed power with 35.3 J/pulse was applied to concentric ring electrodes placed on the optical discs. The protective layer containing the metal layer was completely separated from the plastic substrate by about 30 shots of pulsed power. In order to clarify the mechanism of the metal removal, discharge and shock wave were observed with a high speed camera and a pulse-laser Schlieren system, respectively. As a result, a fan shape discharge was observed after a breakdown took place between the electrode and the metal layer at the first shot. The fan shape discharge expanded until the current become peak, and then it gradually disappeared. The protective layer at the part of the fan shape discharge and its surrounding was separated from plastic substrate. At the second and the following shots, similar discharge appeared until the metal layer around the high voltage electrode was completely separated. Then, the fan shape discharge appeared at the tip of a surface discharge which bridged between the high voltage electrode and the isolated metal layer. On the other hand, the shock wave was mainly observed around the discharge between the electrode and the metal layer. The spread of the fragments of the protective layer containing the metal layer were also observed and followed the shock wave. From the above, it was revealed that the fan shape discharge and the shock wave affected the metal separation from the optical discs.

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