Photovoltaic panel laser debonding

Does laser debonding affect a solar cell's adhesive strength?
The rear Al and silver (Ag) electrodes of the solar cell would absorb the laser pulse energy to induce a temperature rise across the cell/EVA interface,which could weaken the adhesive strengthof the back EVA. The dependence of the debonding effect on the power density (P) and pulse repetition rate (PRR) of the laser was investigated carefully.
How to recycle back Eva layer on solar cells in c-Si PV module?
By utilizing a 1064 nm near-infrared optical-fiber pulsed laser,a laser irradiation followed by mechanical peeling methodwas demonstrated to recycle the back EVA layer on the solar cells in c-Si PV module.
How does laser irradiation affect Eva?
So by adjusting P and PRR of the laser appropriately, the adhesive strength between the solar cell and EVA can be weakened effectively, and at the same time, both the EVA and the solar cell can be undamaged by the laser irradiation. As a result, the back EVA layer can be mechanically peeled off easily from the solar cell.
How does a solar cell/Eva interface work?
The laser energy will be absorbed by the back metal (Al and Ag) electrode, leading to a temperature rise across the solar cell/EVA interface. The temperature rise can weaken the adhesive strength between the solar cell and EVA, which will make it easy to peel the EVA layer off from the solar cell.

To tackle this issue, a novel impulsive light-debonding technique was devised and tested on both model and commercial poly-crystalline PV panels. Nanosecond laser pulses can effectively induce transient ...

How to separate Eva layer from PV panels with minimal pollution? Parametric investigations into methods like the hot knife,high-voltage pulse,and microwave fieldmay yield effective results in ...

To demonstrate laser-based debonding on a commercially available end-of-life photovoltaic (PV) solar panel, a full-sized (1.7 x 1 m 2) module (Poly-Si, 260 W, WSP-260P6, ... t of the solar panel market ...

ABSTRACT The goal of this paper is to determine whether laser-induced surface melting can generate adhesive debonding. Commercial cyanoacrylate and acrylic adhesives are used to attach an ...

Debonding of ethylene-vinyl acetate (EVA) copolymer is critical for recycling the end-of-life (EoL) crystalline silicon (c-Si) photovoltaic (PV) modules. The currently utilized methods are mainly ...

Pulsed laser debonding can be applied to silicon photovoltaic panel recycling. The active silicon cell of a solar photovoltaic (PV) panel is covered by an ethylenevinylacetate (EVA) adhesive ...

ABSTRACT With the increasingly large volumes of silicon solar panels being decommissioned worldwide, we urgently need to come up with a cheap and efficient recycling ...

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I am excited to share that my recent research article, titled "Using Nanosecond Laser Pulses to Debond the Glass-EVA Layer from Silicon Photovoltaic Modules," has been published in Waste ...

The key idea is to overcome heat diffusion and break the interfacial bonds by transient heating with a short laser pulse. Building upon this foundation, the laser-based debonding approach was extended ...

Preliminary experiments using 532 nm pulses showed that the laser debonding method could remove the glass-EVA layer from sections of decommissioned commercial PV panels, even ...

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