

The appearance of the embossing roller for photovoltaic bracket

How does R2R UV embossing work?

In a typical R2R UV embossing process, the liquid resin is cured by the radiated UV light with specified wavelength after it is coated on the polymer film and transferred to the micro features on the roller mold. It has been observed and reported by researchers that the resin experiences shrinkage after being cured [27, 28].

What is R2R embossing?

In the R2R embossing process, a metal roller mold patterned with functional microstructures is the key component, and the quality of replicated micro structures on the polymer film will be directly determined by the pattern on the roller.

Can R2R UV embossing produce 1800 radial Fresnel lenses per hour?

By employing the RDT machined roller mold in this study, it can be calculated that R2R UV embossing can produce 1800 radial Fresnel lenses per hour (i.e. 2 s per lens), without counting the linear Fresnel lens parts in.

What is roll-to-roll (R2R) embossing?

Roll-to-roll (R2R) embossing is an advanced continuous manufacturing method which is able to produce large-area high-quality micro/nano surface structures on flexible polymer film substrate at significantly lower cost and higher throughput compared to traditional molding processes [19].

Can R2R UV embossed Fresnel lens be used in CPV systems?

In summary, a study is conducted to investigate the feasibility of using R2R UV embossed Fresnel lens as a high-quality and low-cost option in CPV systems. For the first time, a complete manufacturing cycle to make radial Fresnel lens array patterned polymer film is utilized to analyze such issue.

Can radial Fresnel lenses be used on embossed polymer film?

Finally, optical performance of both the radial and linear Fresnel lenses on the embossed polymer film is functionally evaluated using a customized solar simulator, and results have shown that 3.9 ± 0.15 times light concentration ratio can be achieved using the embossed radial Fresnel lens compared to the linear lens.

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In this paper, we have firstly studied a complete manufacturing cycle for R2R embossing of radial Fresnel lens polymer film for CPV systems, in terms of polymer lens design, roller mold machining ...

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