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(57) Abstract :
Accordingly, embodiments herein disclose a light trapping structure for solar cells that utilize nano-structured materials and advanced optical coatings to enhance light absorption and maximize the conversion efficiency of solar energy into electricity. The present invention includes an array of micro-lenses on top of a metallic mirror with small apertures for transmitting a focused light. The light is entered to a solar cell with such a light trap on top bounces back and forth between a reflective electrode of the solar cell and a metal surface of the trap, leading to an increased probability of photon absorption. The trapping light with a polymeric retroreflective structure based on a cross-linked poly(dimethylsiloxane) on top of the solar cells is also reported. The effect of this light trapping structure is demonstrated for solar cells with conventional geometry where the photocurrent generation could be improved by 20% upon use of the structure.

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