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Novel light trapping scheme for thin crystalline cells utilizing deep structures on both wafer sides [solar cells]

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Abstract:

A new light trapping structure is presented with trapping capabilities comparable to or better than those of the perpendicular grooves structure. The new structure traps a larger fraction of rays for 8-80 passes than the perpendicular grooves structure. The average path length enhancement is about 62 times the average thickness. The structure consists of deep (-200 /spl mu/m) inverted pyramids on the front side and deep (-200 /spl mu/m) truncated pyramids with eight sides on the back. The structure is realized in crystalline silicon by wet chemical etching using potassium hydroxide (KOH) and isopropanol (IPA). A process for creating thin solar cells with this light trapping scheme is described. The process includes only two main photolithographic steps and features a self-aligned front metallization. The process uses 250 /spl mu/m wafers to create cells that on average are about 70 /spl mu/m thick.

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