THREE DIMENSIONAL SOLAR MODULES

enhanced energy generation

Introduction

T3DP, a start--up company in the USA along with a Singapore partner and collaborator company **Microchip Lab Pte Ltd.,** has since been working on enhancing the solar module efficiencies by a next generation solar technologies such as 3 -- Dimensional / 4 -- Dimensional solar cells & modules combined with new and low cost thin film / compound technologies. Preliminary feasibility study using currently produced CdTe thin film module (Fig.1 & Fig.2) in our 3D technology has resulted in 80% jump in the efficiency from 11% to 19.8%.

As seen below in figure 1.3 we have our new micro 3d solar cell substrates that has 300% more surface area to place semiconductor compared to a flat solar cell.

IMEC, Belgium a world leader in technology is helping us to turn 9 of our micro 3d solar cell substrates into micro 3d solar cells utilizing perovskite and potentially CdTe and CIGS.

We utilize an advanced 3d printing material called Glassomer to 3d print our advanced micro 3d solar cell substrates in fused silica.

As you can see our results with the large design with a low efficiency CdTe faired very well in energy density increase.

We expect to see much better results using high efficiency thin films with the micro 3d solar cell substrates in figure 1.3.
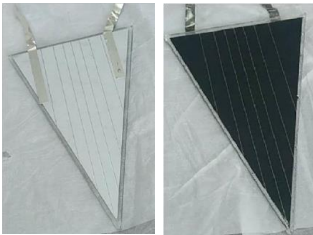

Figure 1: CdTe triangle module samples feasibility study at *3D Hexagonal trapezoid format and* Microchip Lab Pte Ltd, Singapore *tested for efficiency*
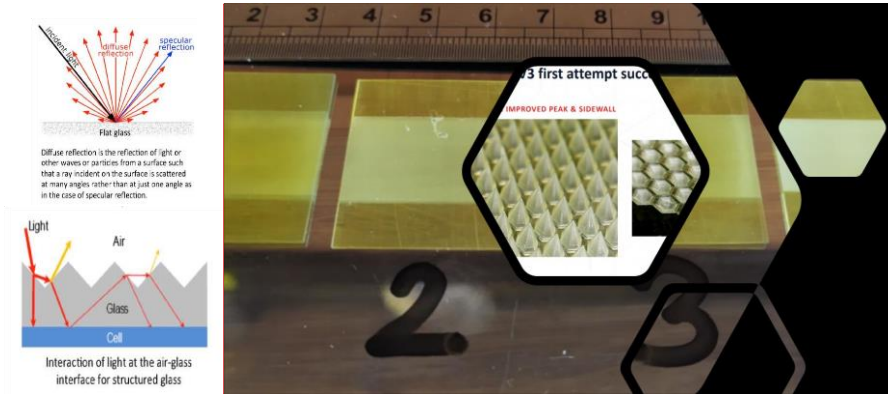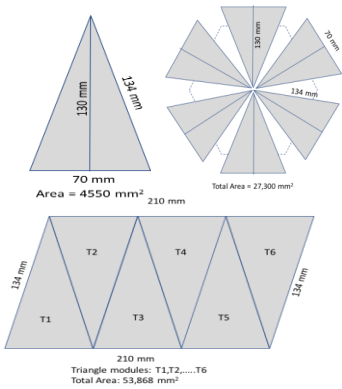
Fig 2. CdTe modules assembled in produced for Microchip Lab Pte Ltd, Singapore

Figure 1.3

Fig 3: 3D array solar module installation at future solar farms

130 mm
134 mm
70 mm
Area = 4550 mm²

130 mm
70 mm
134 mm
Total Area = 27,300 mm²

210 mm

134 mm | T2 | T4 | T6 | 134 mm
T1 | T3 | T5

210 mm
Triangle modules: T1,T2,.....T6
Total Area: 53,868 mm²

Triangular)/)3D)solar)panels)vs)flat)rectangular)solar)panels:) Calculations)&)Data:

Triangular)Solar)panels:

!   Dimensions)/)Area)for)each)triangular)solar)module

! Dimensions)/)Area)for)each)six)(hexa))solar)module) *Flat%/%Rectangular%Solar%panels:*

Dimensions)/)Area)for)each)six)flat)solar)module) **Light)exposure)Test)Results:**

Rectangular)flat)panel)area)=)53,868)mm²

Measured)flat)module)efficiency)=)11%   Triangle)3D)module)area)=)27,300)mm² Measured)3D)module)efficiency)=)17.6%