

# [Example of the capability of crystalline silicon, thin-film solar cells, and phot...](https://assignbuster.com/example-of-the-capability-of-crystalline-silicon-thin-film-solar-cells-and-photonic-nanostructures-to-enhance-efficiency-of-solar-panels-for-domestic-use-literature-review/)

1. Introduction
Even though fossil fuels and coal mines its still in adequate quantity base in some industry expert the earth is it experience sudden climate change that common believe as the result of the mining tapping and use coals and fossil fuels to provide a electricity to homes and industry all over the worldsince the Industrial Revolution [7]. So one of great thing concern of today its how to renew efficient and cost effective solar energyfor domestic use. Solar energy its intense heat and light from the sun utilize through a array of different technology like solar thermal energy and photovoltaics [3]. Its one of most promising source of renewable energy nowadays. The solar panel industry its affect by economic problems and financial problems during this period. The move forward of solar energy need addition research about new method of change solar energy to a electric power with less cost and efficiency.
People research many way and advise how it use and improve solar panel use for personal purpose. One method to its enhance the absorptive capacity of solar panels is utilize various materials like organic resources cadmium telluride (CdTe) amorphous silicon (a-Si) and crystalline silicon (c-Si) among other [7]. Another key method to it enhance the efficiencey of solar panel are utilize light trapping structure thats boost the capacity of solar cell component to absorb light. Light trapping structure it use in order to raise amount of photons or light to absorbs by the solar cell components thats can produce the electron-hole pair [7]. Use economic solar cell materials. and cheap substrate for light trapping structures in to attain great absorptive capacity will less cost. So the thin film solar cells will be benefit significant from improve light trapping structures [6]. This it light trapping structure is can expand the optical path distance. Then this result in the less of the material utilizatin in solar panels.
2. Trends
Many research in photovoltaic (PV) solar energy for domestic use it present focus in less the cost per watt of electric power generate. Many study are continue held about numerus technology to get this goal. However c-Si its still the current technology because c-Si PV have many advantage tofacilitate extensive distribution [6]. Its expect that PV electricity can distribute to household at minimum rate is $0. 10 per kilowatt-hour (kWh) because of is growth and advance production of module and power electronics [5]. This is finding is prove. Certain researcher experiment with an different methods and technology to substantiate this.
Couple-wave analysis technque is use by Guo and the his group for creates double-side grating light trapping structures for ultrathin silicon solar panels [2]. The use of a information that thin layer lead to low absorption tru reduce optical length so the thin-film solar cells’ photoelectric conversion efficiency is not satisfying. To resolve this problem an important light trapping method is carryout in the design of thin film solar cell with more absorptive capacity. It now on a combination of back reflector and randomly texture interface[2]. This material can expounds the optical path and produce systematic and more cost friendly diffusion at big gradients of the deflect light, so that absorptive capacity can be advance. The researcher know thats application of double gratings in ultrathin solar cells it more better than a single grating (either bottom or topgrating) [2]. The double grating make an possible of generate large optical absorption over whole operation solar scale.
Abdulgafar and associates [1] hold a less cost way of advance the efficacy of solar panels for household/personal use especialy for heat purpose. Their perform an distillate water immersion method for to enhance the electrical productive and outcome of polycrystalline silicon panel.
Figure 1. Behavior of polycrystalline photovoltaic cell in different depths of water [1]
The performance of PV panel immerse in water is examine. The efficiencey of the PV panel increase when its put below the cold water. The significant rise in electricity output its reports for low distillated water [1].
Trompoukis and colleagues [6] say that less the number of crystalline silicon material use its can make the cost low. They put together a 1 μm c-Si solar cell system base on thin film technology in to 2D periodic photonic nanostructures. The saw that that nanopatterning enhance the optical quality of solar cell its does not affect material in great sense and electrical quality [6]. Put nanopattern parameters in an more complex solar cell structure and is use it will make greate improvement of the efficient of solar panels. It is possible to become less cost PV technology made possible by photonic-supported thin-film solar cells [6]. Yu and colleagues [8] its also report that 2D gratings makes great improvement over one dimensional grating. The below image shows the effect of the balance of the grating contour on absorption enhancement parameters.
Figure 2. A high absorption enhance over the whole wavelength scale is gather by use of the grating structure. Identif the whole absorption bandwidth of an certain material and the upper absorption enhancement parameters in nanophotonic system is a important development in the making of efficient solar panels for domestic use [8].
This is promising advance in field of solar energy research and development most especial about the goal of enhance solar panel efficient for personal/household use.
3. Gap
Its prove that crystalline silicon and thin-film solar cells have ability to be to advance the efficience of solar panels. But this two material also have dis advantage that’s have to address by use of photonic nanostructures. Crystalline silicon panel are expensive to make and thin-film solar cells have an low rate of conversion and only to able to absorb minimal amount of electrical power from sun. How ever base on the study convert solar cells to module outcome result is reduction of efficacy for silicon cells and thin-film, Contrast silicon cells in cost per watt thin film its can low the cost of production but their low level of efficiency should countr balance with improve rate of deterioration or field outcome [4, 3]. The literature review show it researchers is still attempt to enhance the efficience of solar panels for personal use by use crystalline silicon and thin-film solar cells.
4. Solution
Many of solar cell use to personal purpose is in bulk and it make from single or multiple crystalline silicon. Even it is make for the less cost of solar cell module production the important boost in conversion efficience and decrease in the cost of solar cells is difficult to get throug tradition solar cell systems and material [7]. This why it is important to produce and research on solar cells with lesser feedstock and high efficiency of conversion, and reduced cost of production. The biologica chemical, and physical trail of research and development of solar energy meet with nanoscience. The make of elaborate nanoscale structure make accumulate of active molecular component for sake of the process of capture convert and store solar energy with accuracy and dependable not achieve in past [4, 3]. An mechanism of nanoscale production identificatin and replication provide important knowledg of molecular process of solar conversion and of importance path for next research in future.
So photonic nanostructures is an potential resolution to less solar cell product cost and advance solar panel efficience for personal/household purpose. The consolidation of nanoscale physic chemistry and biology is new develop that form potential interdiscipline paths to efficienc convert of solar energy [3]. They very very strong demand for increase energy output in near future and value in sun light as an sustaine green energy resource and it fast develop in the in the biology chemistry and physic of conversion of solar energy at the nanoscale is strong force for an organize research and developmnt project in solar energy use.
For resolution of the problem it much simple to say that nanostructured material is be use instead of bulk type material, The are two significan reason why the nanostructures the most promising solution. Base in Narasimhan and Cui [4] this is enhance the function and out come of traditional solar cell and facilitate highlevel of conversion efficienc from low cost material with reduce consumtion of a energy and reduce cost of production.
5. Conclusion
Before its look impossible to advance efficienc of solar panels. It also impossible before to it make it cheap for house use. But with a advance of technology and research in potential method to enhnce the capture conversion and store of solar energy the ultimate resolution to problem seem to possible. Crystalline silicon and thin-film is now it the most study material in area of solar energy utilization in add to the the water cooling method. But as it the study the efficienc of this materials eventualy deteriorate so another solution must made. Photonic nanostructures its another promising solution because is capable to boost the efficacy of traditional solar cells and is make the production cost much low.

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