To gain high thermal conductivity and ruggedness of the solar cell array, a shingled array of solar cells was introduced by Charles Z. Leinkram et al. in 1973[1]. Based on this concept, we study the array of imbricated solar cells for the performance increase of photovoltaic (PV). We scribed and split the solar cells and connecting them serially to make an array of solar cells. Since an array of split and serially connected cells has no busbar on top of the surface, it can have larger active area than an array of normal solar cells relatively. The proposed approach do scribing and split the silicon solar cells first with a nanosecond laser. While scribing cells, we investigated the scan speed, numbers of repetition, power, pulse width and the frequency of the laser and the values were 1300mm/s, 30, 9.87W, 6ns, 50KHz respectively. Considering the performance and manufacturing cost at the same time, study on these conditions were essential. These split cells are connected each other using by electrically conductive adhesive instead metallic wire connection. By dispensing conductive adhesive on top of the front contact and connecting rear side of a next split cell, an array of imbricated solar cells were prepared. Aside using the metallic wire connection, we can have benefit for fill factor and increase the performance by using imbricated cells since the series resistance between front and back contact of the cells are affecting to the fill factor directly. Also, by connecting cells with imbricated way, solder is not exposed to the sunlight directly which may cause the decrease of the performance as time goes on. The comparison between imbricated solar cells and a conventional cell with same area also will be discussed.