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Abstract: The ultra-long hierarchical bud-like branched TiO_2 nanowire arrays on flurine-doped tin oxide glass substrate have been prepared via a two-step solution route, which involves the growth of the anatase TiO_2 nanowires with the length of 48 μm on flurine-doped tin oxide glass substrate, followed by a secondary growth of the rutile TiO_2 nanorods on the as-grown TiO_2 nanowires backbone. The dye-sensitized solar cell based on the hierarchical bud-like branched TiO_2 nanowire arrays shows a power conversion efficiency of 6.00%, which is nearly 2.88 times as high as that of bare TiO_2 nanowire arrays because of the preferable nanostructure, which not only retains the efficient charge separation and transport properties of one-dimensional TiO_2 nanostructures, but also improves the amount of dye adsorption and light-scattering ability due to the branched structure.