The solid-state TiO2/Dye/PANI solar cells were fabricated by the sandwich assemble technique, where the porous nano-TiO2, commercial N3 derivative and synthesized tube-like PANI act as photoelectrode, electron donor and hole transport layer (HTL), respectively. Effects of pH value of sol-gel reaction and annealing conditions on the particle size, surface area and crystallization of TiO2 as well as the photovoltaic characteristics and photo-to-electron conversion efficiency ( ) of the solid-state TiO2/Dye/PANI solar cell were studied. The influence of PANI morphology and its conductivity was also discussed. I-V characteristics curve measurements showed that the of solid-state TiO2/Dye/PANI solar cell is strongly related to the preparing pH value, annealing conditions and film thickness of annealed TiO2. The significantly decreased with increasing the annealing temperature and annealing time due to the increase in the micropore volume of annealed TiO2. The highest (ca. 0.00916 %) of solid-state TiO2/Dye/PANI solar cell can be obtained when the pH was 7.0,TiO2 annealed at 450℃for 30 min and the thickness of annealed TiO2 was 2.014 μm. When (Zn(DBS)2) was added into PANI, the PANI molecule chain became apparently aggregation and exhibited a blue shift phenomenon, as compared with the free-(Zn(DBS)2) PANI system, the hole mobility in PANI significantly decreased from 1.356 to 0.3060 cm2/Vs, leading to the decrease in. In spite of that the Isc value of HTL increased gradually with increasing the illumination time, the is lower than that of PANI system free of (Zn(DBS)2). As for I-V characteristics measurements, values of Voc and Isc of solid-state TiO2/Dye/PANI-LICl solar cell are apparently improved due to the decrease in HOMO and reduced resistance and transition distance of electrons in the conductive band. At 0.5M LiCl, the of TiO2/Dye/ PANI-LICl solar cell was about 0.2468 %.