Dye-sensitized Solar Cells Composed of ZnO Nanorods by the Chemical Bath Deposition.

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Nanostructured ZnO-based dye-sensitized solar cells (DSSCs) have attracted considerable attentions in the recent years due to the similarity of the energy band gap and the electron-injection process of ZnO to that of TiO_2. In addition, the electron mobility and the electron transfer process from the excited dyes are similar and the electron injection efficiency of ZnO is almost equivalent to that of TiO_2. Recent studies on ZnO-based DSSCs have mostly focused on the improvement of electron transport and reducing the recombination rate by either a series of hopping events between trap states on neighboring particles or diffusive transport within extended states slowed down by trapping/detrapping events. Therefore, one way of achieving higher photovoltaic performance is to use one-dimension nanostructures. In this paper, we prepared the DSSCs with the ZnO electrode using the chemical bath deposition (CBD) method under low temperature condition (< 100℃). To achieve truly low temperature growth of the ZnO nanostructures on the substrate, a simple two-step method was developed and optimized in the present work.