Morphology control of rutile TiO_2 nanorod thin films on fluorine-doped tin oxide glass by hydrothermal process

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Because of outstanding photovoltaic properties, TiO_2 nanorod thin films have drawn great attentions in the past few years. They have been used for various applications related to the photovoltaic field such as hydrogen generation or solar cells. The control of morphology and structure plays a key role in producing high-performance materials for efficient applications. By hydrothermal method using a TiO_2 precursor in acidic solution, uniform and highly crystalline TiO_2 nanorods were prepared on fluorine-doped tin oxide substrates. New structures including nanoflower and nano-branch were also observed during the hydrothermal growth of TiO_2 nanorods. The structural and morphological characteristics of thin film were monitored over time at different reaction temperatures.