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A study of the effect of nitrogen doping in TiO_2 LISA DEBEER-SCHMITT, NSSD, ORNL, XIAOFENG QIU, IBM TJ Watson Research Center, LARRY ANOVITZ, CSD, ORNL, WILLIAM HELLER, KEN LITTRELL, NSSD, ORNL, M. PARANS PARANTHAMAN, CSD, ORNL — TiO_2 nanotube arrays have great potential as photovoltaics due to its unique chemical and physical properties associated with highly ordered tubular geometry. Small-angle neutron scattering (SANS) can characterize the specific nitrogen doping impact to the nanotube array structures. N-doping holds the promise of overcoming the large intrinsic bandgap barrier, which prevent TiO_2 from utilizing larger portion of solar energy. Combining with nanotube structures, N-doping could further promote the energy conversion efficiency of TiO_2. The SANS data demonstrate that the nitrogen doping during the nanotube growth alters their structure. This stabilized structure is evident in the data via extra peaks in the nitrogen doped sample as compared to the pure. The results demonstrate that the nanotube array morphology can be manipulated by varying the growth conditions, making it possible to tailor the arrays to specific purposes.

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