Nanoporous TiO$_2$ as Low-n Material for DBR Device

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TiO$_2$ have been studied intensively, since they have diverse applications such as opto-electronic devices, photocatalysts, antireflection coatings for silicon solar cells, and photoanode materials for dye-sensitized solar cells (DSSC). Nanoporous TiO$_2$ thin films were spin-coated using surfactant-templated approach from Pluronic P123 (EO$_{20}$PO$_{70}$EO$_{20}$) as templating agent, titanium (IV) butoxide (Ti(OC$_4$H$_9$)$_4$) as the inorganic precursor, and butanol as the solvent. The refractive index and the thickness of thin films were valued by Spectroscopic ellipsometry (SE). Distributed Bagg Reflector (DBR) device was fabricated by continuous spin coating above sol solution and another sol solution containing (Ti(OC$_4$H$_9$)$_4$) butanol and HCl one after another. The reflectance of the thin films was measured and compared with the simulated results.