Surface wettability of titania thin films with increasing Nb content

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Résumé en anglais	TiO2 and TiO2/Nb amorphous thin films were grown on glass substrates by a sol-gel technique (spin coating). Films' surface composition, structure, and morphology were derived from x-ray photoelectron spectroscopy, x-ray diffraction, and atomic force microscopy data. The investigated films showed a smooth surface (roughness values below 5 nm). A separate surface wettability investigation showed that by increasing the Nb amount in pristine titania films results in a decrease of contact angle (CA) values from 40 degrees to nearly 0 degrees, thus, indicating a super-hydrophilic conversion under UV illumination. This conversion rate is greatly enhanced by increasing the Nb content, the surface super-hydrophilic behavior occurring after a couple of minutes in the TiO2/Nb samples, but after 4 h in the pristine titania specimen. The current results are discussed in terms of the optical band gap shift towards higher energies, by increasing the Nb content in the films, a process explained based on small polaron hopping model. (C) 2012 American Institute of Physics. [http://dx.doi.org/10.1063/1.4757007] [10]
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