

NIBIUM DOPED TiO₂ FILMS BY CHEMICAL SPRAY PYROLYSIS

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Nb-doped TiO₂ layers were fabricated by chemical spray pyrolysis and characterized their morphology, structural and optical properties as a function of the Nb content in the spray solution. The films were sprayed from the solution containing titanium (IV) isopropoxide (0.2 molL⁻¹) and acetylacetone in a molar ratio of 1:2 in ethanol. Niobium (V) ethoxide was used as the Nb- source, Nb content was varied between 0 and 40 at% in the spray solution. The resulting TiO₂ and Nb-doped TiO₂ layers were annealed at 500°C and 700°C for 30 min in air. According to SEM, the TiO₂ film is uniform with the thickness of 260 nm. Nb-doped TiO₂ samples consist of a film covered with particles. The number of particles increases, however, the thickness of the films decreases from 245 nm to 130 nm with increasing the Nb content from 10 to 40 at% in the spray solution. The EDX studies confirm the presence of Nb in the layers. Although the Nb/Ti ratio for the film is decreasing from 0.05 to 0.02 with increasing the [Nb] in the spray solution, it is conversely increasing for nanoparticles from 0.3 to 0.6. Raman and XRD analysis show that the as-deposited samples are amorphous. The samples annealed at 500°C consist of anatase phase irrespective of the [Nb] in the solution.



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