

Doping NiTiO₃ materials with cobalt and tungsten: Effects on structural and optical properties

장개명¹, Pham Thanh Truc^{2,†}, Yong Men^{3,4}, 신은우²

¹울산대학교; ²울산대학교 화학공학부;

³Shanghai University of Engineering Science;

⁴College of Chemistry and Chemical Engineering

(wkddj5181@hanmail.net[†])

NiTiO₃ materials doped with cobalt (Co) or tungsten (W) were prepared by a modified Pechini method through a solvothermal treatment. The prepared Co-doped and W-doped NiTiO₃ powders were characterized by X-ray diffraction (XRD), Raman, Fourier-transform infrared spectroscopy (FTIR), Scanning Electron Microscope (SEM), UV-vis absorption spectroscopy, photoluminescence spectra (PL) and BET surface areas. The results show that Co²⁺ ions preferred selectively doped into Ni²⁺ sites in the NiTiO₃ lattice and maintained an ilmenite structure while the W doping into the ilmenite structure resulted in an irregularity in the materials with decreasing crystallite size. As for optical properties of the materials, the PL emission intensities decreased with increasing doping content, implying that the recombination process was inhibited to some extent by the dopants.