

# ***Preparation of Nd<sup>+3</sup>:TiO<sub>2</sub> via Sol-Gel and study of its optical properties***

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## **Abstract**

Doped and undoped nanostructured titanium dioxide was prepared via Sol-Gel method under varying conditions to determine the effects of neodymium ion doping on the titania lattice. Specifically, the effects of doping rate on the grain size of titanium dioxide particle were studied. Samples were analyzed by a variety of techniques, including X-ray diffraction, UV-Visible spectroscopy, FTIR spectroscopy and fluorescence spectroscopy to investigate the optical properties and structural effects of dopant addition. The grain size was calculated by using Scherer's formula and it was found that the grain size of TiO<sub>2</sub> particles decreased with increasing of Nd<sup>+3</sup> doped rate.

A fluorescence spectrum in NIR region was recorded to Nd:TiO<sub>2</sub> sample, when the sample was pumping with 808nm laser diode, and with power equal to 1W. The fluorescence peaks of dopant sample are not similar to the known fluorescence peaks of Nd:YAG crystal in NIR region.

The fluorescence spectrum of Nd:TiO<sub>2</sub> sample gives an acceptable indication in the direction of preparation of laser active medium.

Key word: Sol-Gel, Nano technology, TiO<sub>2</sub>, laser active medium

## **References**

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