

Green luminescence of Tb³⁺ doped in Cadmium Silicate

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Abstract – This work presents the preparation of the terbium doped in cadmium silicate matrix, CdSiO₃, through the use of a traditional method. In the preparation the appropriate precursor were mixed and heated at 1000°C for 5 h, leading to a luminescent compound. X-ray diffraction and infrared spectroscopy will be used to characterize the luminescent material. The photoluminescent properties of this compound were studied based on the transitions in the spectral range from 340 to 800 nm.

The research on the luminescent materials containing trivalent rare earth ions (RE³⁺) has increased considerably in the last three decades [1, 2 and 3]. Major applications are in emissive displays and fluorescent lamps. In addition, some X-ray detector systems are based on luminescent materials as well. Quite a few of these materials also found their way into applications. In many cases, rare earth phosphors noticeably improved the performance of the devices.

The photoluminescent properties of the Tb³⁺ ions make them potential candidates for use as luminescent materials [4]. However, the terbium ion don't provides additional facilities in the interpretation of the spectral data as compared to the europium ion. The Eu³⁺ ion has a great advantage because it has non-degenerate ground and emitting states and the ⁵D₀→⁷F₀ transition gives information about the impurity or if this ion occupies more than one site symmetry.

In this work the photoluminescence of terbium ion (5% mol) in the CdSiO₃ matrix is available according the potential use of this material as probe optical.

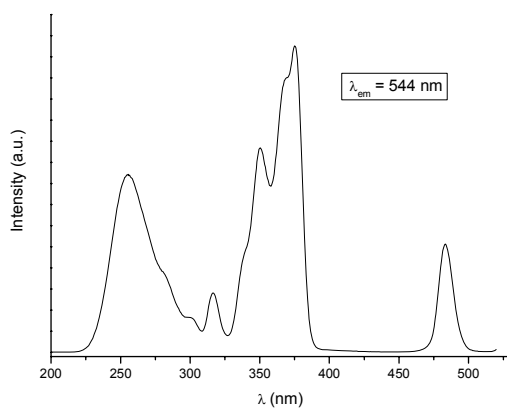


Figure 1: Excitation spectrum of Tb³⁺ in the compound

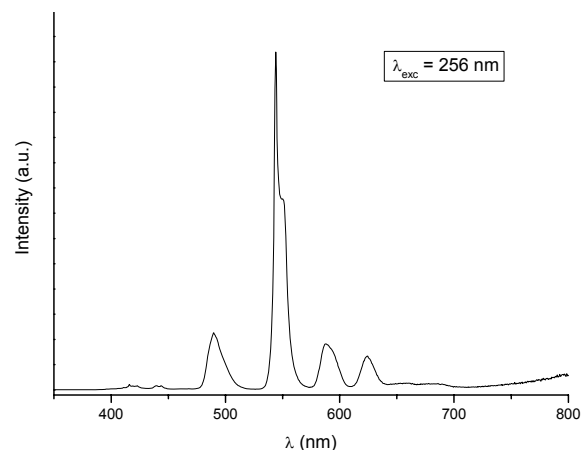


Figure 2: Emission spectrum of Tb³⁺ in the compound

References

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