INVESTIGATION OF CALCIUM (II) AND VANADIUM (V) DOPED YAG PHOSPHORS

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Nowadays, research of novel garnet ceramics is focused on improvement of optical properties, such as emission intensity, quantum efficiency, decay kinetics and on their application in different areas. The optical properties could be enhanced by suppressing charge recombination during the electron transfer processes, via crystal field modulation, energy transfer or charge compensation. Charge compensation is the most commonly used method because it can be easily realized. The alkali metal ions, with low oxidation states and different ionic radius, can enhance optical properties of rare-earth ion activated phosphors by co-doping method.

Doped YAG could be a perfect lasing medium due to the properties mentioned. A lot of scientific papers have been published on the wide variety of rare-earth and other trivalent ions (e.g., Er^{3+}, Ho^{3+}, Tm^{3+}, Yb^{3+}, Cr^{3+}), which can be incorporated into the YAG matrix. However, one of the current challenges and a huge interest for garnet research is how to obtain a single phase YAG when it is doped with larger quantities of divalent or pentavalent ions.

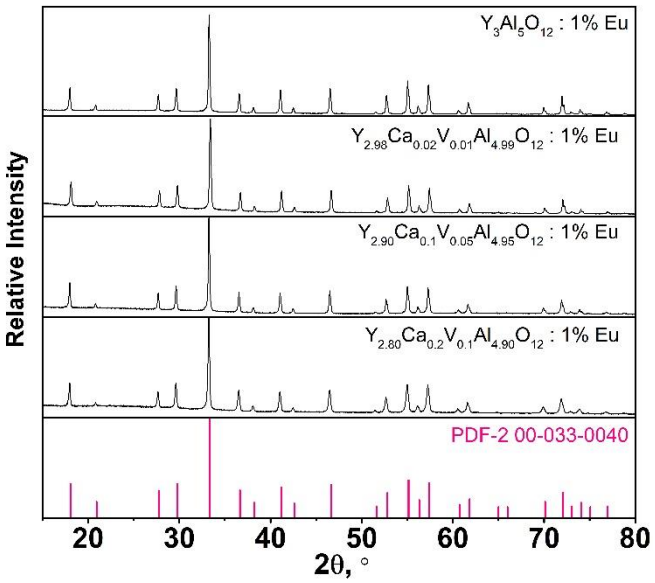

Fig. 1. XRD patterns of $Y_{3-2x}Ca_{2x}V_xAl_{5-x}O_{12}$: 1%Eu, when x = 0.01–0.1, synthesized via Sol-Gel assisted Molten-Salt route, annealed at 1300 °C in KCl, in air.

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