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Abstract
Yttrium aluminum garnet powder (YAG) was synthesized by a novel solid state reaction method. Three aluminum sources: boehmite, γ Al2O3 and α Al2O3 were estimated for the YAG formation. According to the experimental results, boehmite was the best aluminum source of YAG powder. Pure YAG phase identified by X-ray diffraction (XRD) was formed by pre aging at pH=1 and then heat treating at 1500℃ for 36 hr. The best cerium doping concentration of YAG was found at 0.05 at% which had the highest emission intensity at 535 nm as exciting at 470 nm. Increasing the cerium concentration, the emission intensity has decreased because the impurity phase of cerium oxide was found in the XRD pattern. The emission intensity of cerium doping YAG was increased by increasing the calcination temperature and increasing the heat treated time, respectively.

In the second part of this study, the sintering property of YAG powder was studied. The powders pre treated at different temperatures for 10 hrs, respectively were sintered. The best pre treated temperature was at 600℃ which had the highest sintering density of pellet (90.5%). The low relative density of the pellet pre treated at 800℃ for 10 hr might be due to the low packing density. Adding TEOS could improve the YAG sintering. The mean relative density of sintered pellet with TEOS aid could reach to 99% as it pre treated at 600℃ and then sintered at 1650℃ for 5 hr. All sintered pellets with TEOS were appeared translucence.
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