عنوان مقاله:
Synthesis of pure YAG nano powders by co-precipitation method

محل انتشار:
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خلاصه مقاله:
Nano-sized powders of aluminum yttrium garnet (nano-YAG) have been successfullysynthesized by regular co-precipitation method using ammonium hydrogen carbonate (AHC)as the precipitant solvent. To investigate the effect of calcination time, the dried powders werecalcined in a conventional furnace at ۱۱۰۰ °C for various durations i.e. ۱۵, ۳۰, ۴۵, ۶۰ and ۱۲۰min. The phase transformation and micro-structural features of the crystalline samples werecharacterized by X-ray powder diffraction and field emission scanning electron microscopy(FESEM) techniques, respectively. Thermal analysis of samples was investigated bydifferential thermal analysis and thermal gravimetric analysis (TG/DTA). It was found thatcalcination time play an important role in the aluminum yttrium garnet synthesis process. Xraypowder diffraction pattern indicated that the pure YAG phase was synthesized viacalcination at ۱۱۰۰ °C for ۱ hour. Shorter calcination time leaded to appearances of YAM($Y_4Al_2O_9$) and YAP ($YAlO_3$) peaks (accompanied by strong peaks related to crystalline YAGphase). The phase transformation and decomposition stages of precursor powders wereproposed based on TG/DTA results during heating process up to ۱۲۰۰ °C. Moreover, FESEMimages revealed that the average particle size of pure YAG (after ۶۰ min of calcination) wasabout ۵۰-۶۰ nm.

کلمات کلیدی:
YAG, Nano-sized powder, Synthesis, Co-precipitation method

لینک ثابت مقاله در پایگاه سیویلیکا: