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**SYNTHESIS OF THE NANOSTRUCTURED YAP:Ce VIA SPRAY PYROLYSIS BY
POLYMERIC PRECURSOR SOLUTION**

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The yttrium aluminum system (Y_2O_3 - Al_2O_3) includes three compounds: yttrium aluminum garnet ($Y_3Al_5O_{12}$, YAG), yttrium aluminum perovskite ($YAlO_3$, YAP) and yttrium aluminum monoclinic ($Y_4Al_2O_9$, YAM). YAP doped with Ce is well known optical material used as a fast scintillator for synchrotron X-ray experiments. Synthesizing single YAP phase is difficult even through wet chemical processing because of the possible allocations of other phases. Here, we synthesized fine powders of $YAlO_3:Ce^{3+}$ via spray pyrolysis of polymeric precursor obtained by dissolving the corresponding nitrates in ethylenediaminetetraacetic acid (EDTA) and ethylene glycol (EG) solution. Aerosol droplets are decomposed at 550 °C in argon atmosphere. In order to get a pure YAP:Ce phase as-prepared particles were additionally thermally treated in the range from 900 °C to 1100 °C for 12 hours in the air atmosphere. Energy dispersive analysis (EDS) confirmed high particle purity and desirable Y:Al ratio. Also, scanning electron microscopy (SEM) showed changing morphology with increasing the heating temperature. Inner particle structure is analysed by transmission electron microscopy (TEM) while phase identification is performed by X-ray powder diffraction (XRD). Detailed structural analysis is performed through Rietveld refinement in Topas Academic software.