SUPPORTING INFORMATION

Influence of neodymium-doping on structure and properties of yttrium aluminium garnet †

Xudong Zhang,* Wen He,*a Yuanzheng Yue*a,b and Yang Zhangc

a Institute of Materials Science and Engineering, Qilu University of Technology, Jinan 250353, China. Fax: +86 531 89631080; Tel: +86 531 89631518; *E-mail: hewen@126.com

b Section of Chemistry, Aalborg University, DK-9000 Aalborg, Denmark. *E-mail: yy@bio.aau.dk

c College of Engineering, Ocean University of China, Qingdao 266100, China.

Fig. S1   TG and DTA curves of YAG precursors with 20 atom% Nd-doping (A) and without
Nd-doping (B)

Differential thermal analysis (DTA) and thermogravimetric analysis (TGA) were carried out on a CRY-2 differential thermal analyzer and a TGA/SDTA851\textsuperscript{e} analyzer, respectively, under nitrogen flow. The precursor was heated from 100 °C to 1100 °C at a heating rate of 10 °C min\textsuperscript{-1}.

The combined TG and DTA curves obtained from the YAG precursors with Nd-doping (A) and without Nd-doping (B) are shown in Fig. S1. The TG curve of the YAG precursor with Nd-doping (A) indicates a rapid mass loss of nearly 15.4% from 100 to 1100 °C, which corresponds to a endothermic peak from 100 to 400 °C and two exothermic peaks at 556 and 908 °C in the DTA curve. The endothermic peak at low temperature can be attributed to the moisture removal. The exothermic peak at 556 °C is due to the decomposition of NH\textsubscript{4}HCO\textsubscript{3} and nitrate ions in the precursor with the evolution of the gases CO, CO\textsubscript{2}, NO and NO\textsubscript{2}. While the exothermic peak at 908 °C could be attributed to the crystallization of different phases of YAG in YAG A, the only exothermic peak at high temperature for the YAG precursors without Nd-doping (B) suggests that its crystallization temperature is higher than that of Nd:YAG.