

Charge conversion and mass transfer on surface of Al_2O_3 nanoparticles in Y_2O_3 - Al_2O_3 colloidal system

Haiming Qin^{a,b}, Xinhai Zhang^b, Dejun Sun^c, Tianzhen Zhang^a, Huaidong Jiang^a, Hong
Liu^{a,d,*}, Yuanhua Sang^{a,*}, Jiyang Wang^a

^a State Key Laboratory of Crystal Materials, Shandong University, Jinan, 250100, China

^b Institute of Materials Research and Engineering, A*STAR (Agency for Science, Technology and
Research), 3 Research Link, 117602, Singapore

^c School of Chemistry and Chemical Engineering, Shandong University, Jinan, 250100, China

^d Beijing Institute of Nanoenergy and Nanosystems, Chinese Academy of Science, Beijing, 100864,
China

***Corresponding author**

Hong Liu, Email: hongliu@sdu.edu.cn, Tel.: +86-531-88362807, Fax: +86-531-88362807

Yuanhua Sang, Email: sangyh@sdu.edu.cn

Supplementary Information

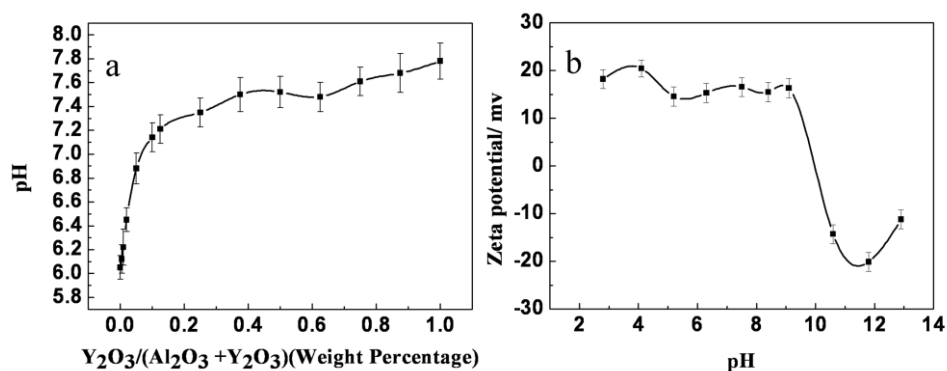


Figure S1. pH of $Y_2O_3-Al_2O_3$ colloidal system as a function of $Y_2O_3/(Al_2O_3+Y_2O_3)$ ratio (a) and zeta potential of $Y_2O_3-Al_2O_3$ (R=0.1) colloidal system as a function of pH (b). Error bars shown represent uncertainties in the pH and zeta potential values obtained.

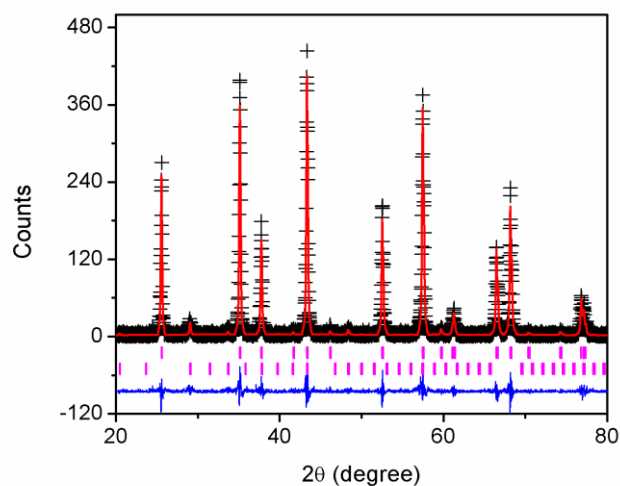


Figure S2. XRD spectrum for the sample R=0.02. Plus signs (+) represent the experimental data while the solid line shows the calculated profile from combined refinement. The difference between experimental and calculated results is shown at the bottom. Upper and lower ticks indicate the expected reflection positions for Al_2O_3 and Y_2O_3 phases respectively. GOF and Rwp of the refinement are 1.75 and 14.5 respectively.

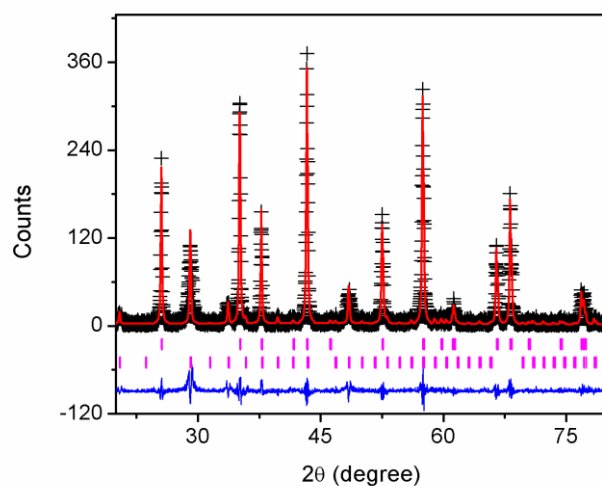


Figure S3. XRD spectrum for the sample R=0.1. Plus signs (+) represent the experimental data while the solid line shows the calculated profile from combined refinement. The difference between experimental and calculated results is shown at the bottom. Upper and lower ticks indicate the expected reflection positions for Al_2O_3 and Y_2O_3 phases respectively. GOF and Rwp of the refinement are 1.58 and 12.4 respectively.

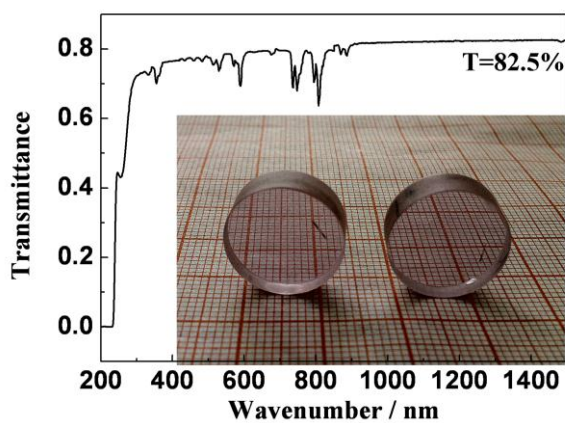


Figure S4. Highly transparent rare earth-doped YAG ceramics prepared via application of the mass transfer mechanism.