Electronic Supplementary Information (ESI)

1.1 Experimental Procedure

A high temperature solid-state reaction method was employed to synthesize $LaAlO_3$: Eu white phosphor. Stoichiometric amounts of high purity (>99.99%) starting chemicals, La_2O_3, Al_2O_3, Eu_2O_3 and Li_2CO_3 in terms of chemical formula were mixed and ground manually with aid of some amount of ethanol to give a slurry. This slurry of starting materials was dispersed with an ultrasonator for half an hour and then dried at 80℃ for 12 hrs. Those dried powders were placed in a corundum crucible then fired at 1400℃ for 4 hrs under a reductive atmosphere of $H_2$8vol.%/$N_2$92vol.%,except those samples in Fig.3 directly fired in air. Phases and crystal structure of the as-received phosphors powders were examined via X-ray diffraction (XRD, Rigaku D/max-2500/pc, $\lambda_{Cu\text{-}K\alpha}$=1.54062nm, Japan). Photoluminescence spectra of samples were recorded by a fluorescencespectrometer (Hitachi F-4500, Japan).And the colourometry parameters were measured by PMS-50 Plus UV-Vis-near IR Spectro-photocolorimeter (Everfine,China).

1.2 XRD Patterns

X-ray diffraction patterns of $La_{0.98}AlO_3$: $Eu_{0.02}$ is represented in Fig.ESI-1. All of the diffraction peaks are agreeable well with JCPDS card (No.31-0022), indicating that phase-pure perovskite type host structure in a single-phase composition has been obtained.

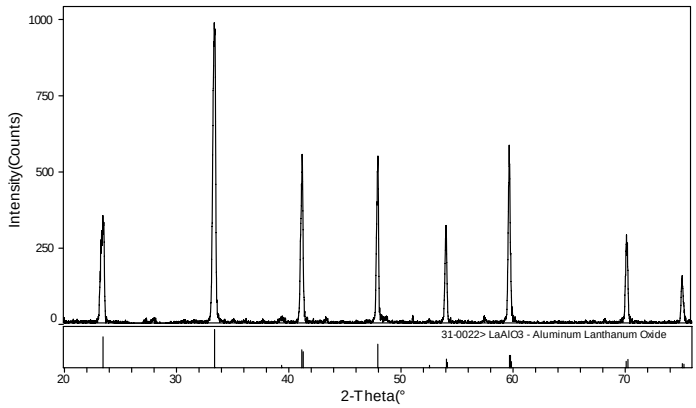

Fig.ESI-1.X-ray diffraction pattern of $La_{0.98}AlO_3$: $Eu_{0.02}$

1.3 Photographs of luminous samples irradiated with 365 nm UV light

The photographs in Fig. ESE-2, were obtained with a digital camera as samples were excited by 365 nm UV light. These images correspond to those CIE points in Fig.6 in the manuscript, respectively, to show a sensitive effect of Li^+ to PL and the evolution of CCT and CIE vs. amount variation of Li^+ added to the $LaAlO_3$ host. Image (2) in

Fig. ESE-2, i.e. point 2 (x=0.3598, 0.2985) in Fig.6 is close to equal-energy white (x=0.33,y=0.33),which is a starting point, as we expected, for us to trace different routes to achieve white light with varied CCT and CIE quality for different purposes, as long as energy transfer between Eu^{2+} and Eu^{3+} can be adjusted efficiently.

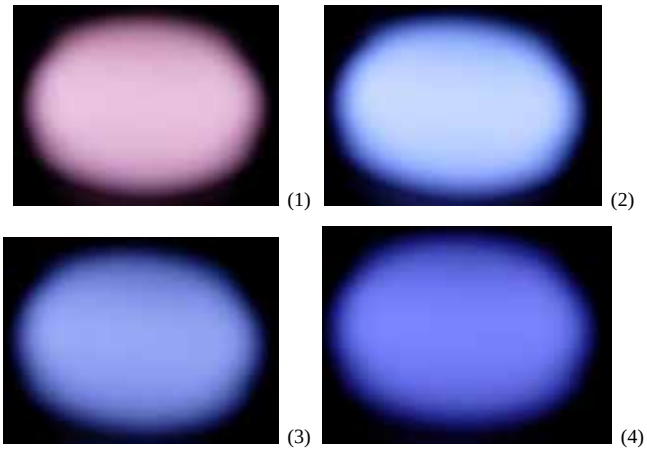

Fig. ESE-2 The photographs of $La_{0.98}AlO_3$: $Eu_{0.02}$,$Li_{,m}$ samples irradiated with 365 UV light

(1)m=0.00,(2)m=0.02, (3)m=0.04, (4)m=0.06

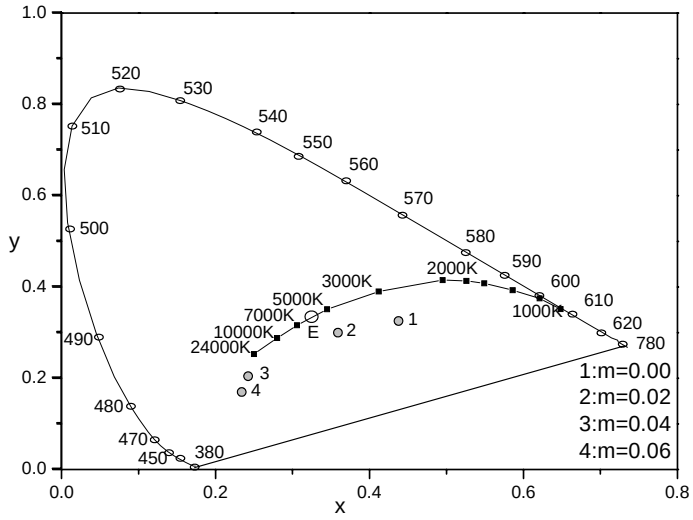

Fig.6. Evolutions of CCT and CIE chromaticity coordinates of $La_{0.98}AlO_3$: $Eu_{0.02}Li_{,m}^{+}$ vary with amount of added Li^{+} ion (m=0.00,0.02,0.04,0.06)