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# Supporting information

## Tailored upconversion emission of $Eu^{3+}$ in $Sr_2Ca(W,Mo)O_6:Yb^{3+},Eu^{3+}$ by laser via electronic polarization mechanism

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To exclude the influence of $Mn^{4+}$ ions introduced by $MoO_3$ raw material as argued by Wai-Lun Chan et al. (J. Mater. Chem. C, 2015, 3,960–963), $SCEYW_{0.5}Mn_{0.5}O$, $SCEYW_{0.95}Mn_{0.05}O$ powders were synthesized following our previous experiments with addition of $MnO_2$(99.95%, Aladdin). XRD patterns in Fig.S1 reveal that the $SCEYW_{0.95}Mn_{0.05}O$ sample is single phased while $SCEYW_{0.5}Mn_{0.5}O$ sample has a few minor impurities.

Upconversion emission spectra of the samples were recorded upon the excitation of a 976 nm laser beam, which are shown in Fig.S2. Inserts are the photographs of the samples. It can be seen that it becomes dark with the introduction of $MnO_2$. The anomalous upconversion emission peak at ~690 nm, does not appear for both $SCEYW_{0.5}Mn_{0.5}O$ and $SCEYW_{0.95}Mn_{0.05}O$ samples. It distinctly shows that the peak at ~690 nm in the perovskite materials is not contributed by the $Mn^{4+}$ ion, but ascribed to the $^5D_0$-$^7F_4$ transition of $Eu^{3+}$ ions.

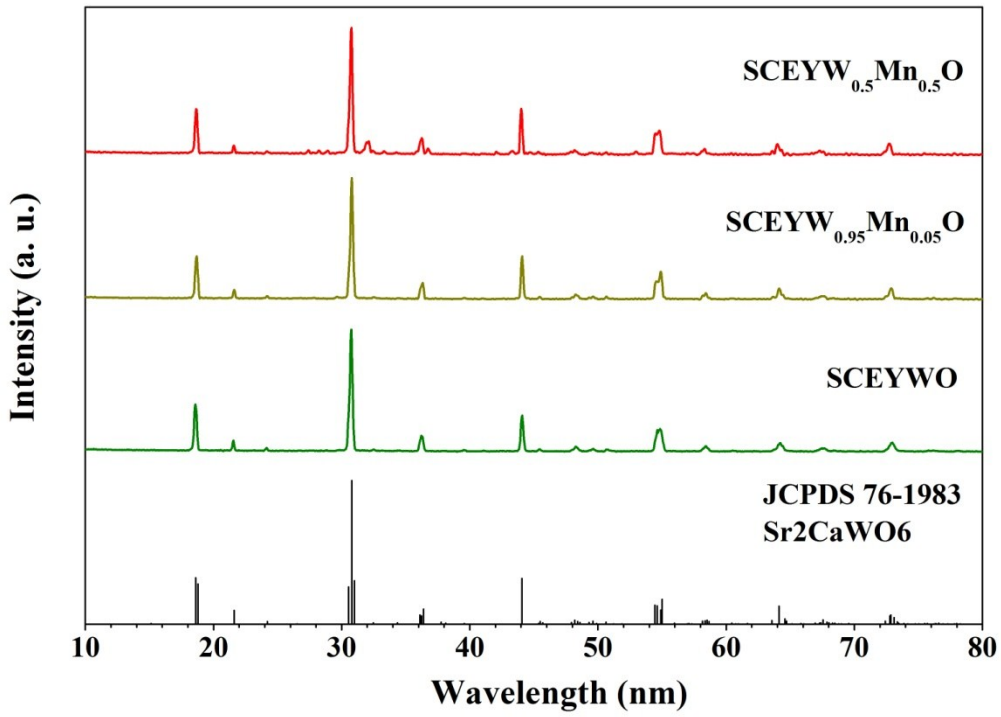


Fig. S1 XRD patterns of $SCEYW_{0.5}Mn_{0.5}O$, $SCEYW_{0.95}Mn_{0.05}O$ and SCEYWO powders. Standard diffraction pattern of $Sr_2CaWO_6$ is included for comparison.

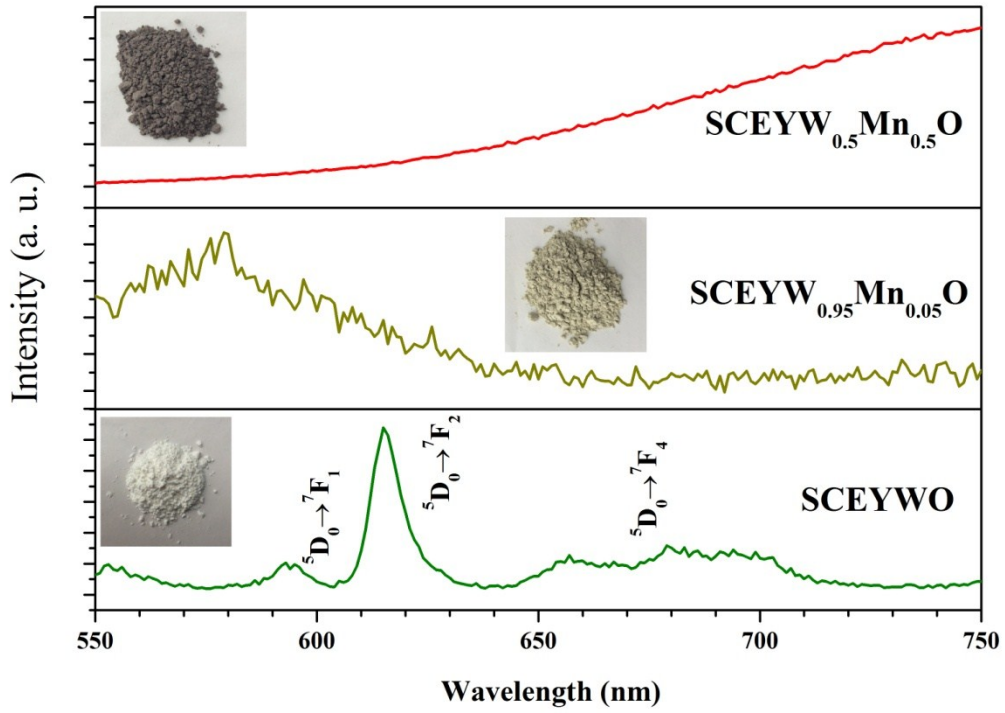


Fig. S2 Upconversion emission spectra of $SCEYW_{0.5}Mn_{0.5}O$, $SCEYW_{0.95}Mn_{0.05}O$ and SCEYWO(insert are photographs of the samples under sunlight ) under the excitation of a 976 nm laser beam.