Electronic Supplementary Material (ESI) for Journal of Materials Chemistry C.

Supporting Information

White light emitting soft materials from off-the-shelf ingredients

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Job plots

Titration of Tb^{3+}, Eu^{3+} and Zn^{2+} with DHN (2 mM solutions were used) were studied by absorption spectroscopy in HEPES-Acetic Acid buffer (pH 7). From these job plots it was observed that all metal ions formed 1:1 complex with DHN.

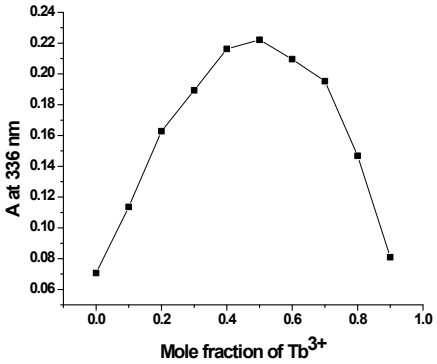

Figure S1 Job's plot for Tb^{3+} and DHN

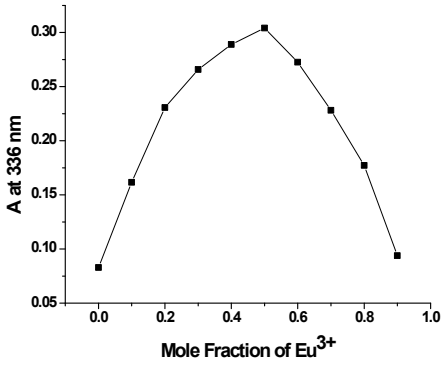

Figure S2 Job's plot for Eu^{3+} and DHN

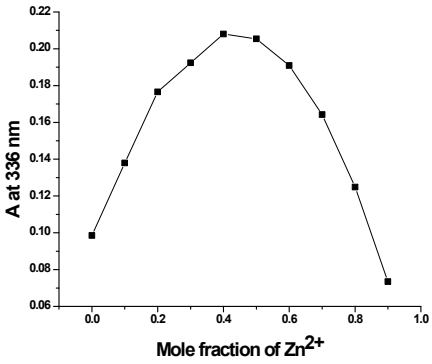

Figure S3 Job's plot for Zn^{2+} and DHN

Binding constant determination

Binding constants of metals and DHN were determined by fluorescence titration,[1] in which fixed concentrations of DHN was taken with increasing metal ion concentration (in HEPES-Acetic Acid buffer, pH 7)

As the binding is 1:1 mode, the binding reaction can be represented as

M + L = [ML]

Where L is DHN and M is Metal ion (Tb^{3+}, Eu^{3+} or Zn^{2+})

The Binding Constant will be given by

$K = [ML]/ [M] [L]$

$[M] = [M_o]-[ML]$; $[L] = [L_o]-[ML]$

$[M_o]$ and $[L_o]$ are concentrations before formation of the complex.

So,

$K = [ML] / [M_o]-[ML] [L_o]-[ML]$

For fluorescence measurements the following equation is followed

$F = F_L[L] + F_M[M] + F_{ML}[ML]$

F is the intensity of total fluorescence observed, F_L for DHN, F_M for the metals and F_{ML} for the Metal-DHN complex which can be substituted by the maximum F i.e., $F_{max.}$ Since the metals are not fluorescent at 380 nm (wavelength under study) the equation can be simplified as

$F = F_L [L] + F_{max} [ML]$

Using $[L] = [L_o]-[ML]$

$F=F_L + (F_{max}-F_L) [ML]/ [L_o]$

$[ML]= (F-F_L) [L_o]/ (F_{max}-F_L) =\Delta F [L_o]/\Delta F_{max}$, where $\Delta F= (F-F_L)$; $\Delta F_{max}= (F_{max}-F_L)$

Then,

$K= \{\Delta F\times[L_o]/ \Delta F_{max}\} /\{ [L_o] -\Delta F\times[L_o]/ \Delta F_{max} \}\{[M_o]-\Delta F\times[L_o]/ \Delta F_{max} \}$

Using this equation K value of the complexes was determined.

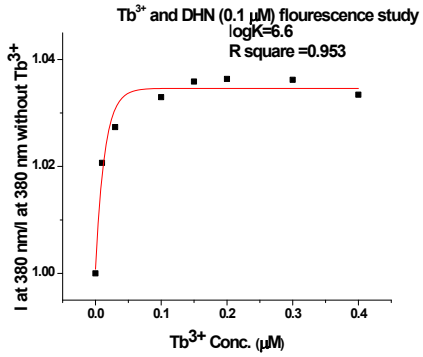

Figure S4 Fluorescence titration curve of Tb^{3+} and DHN

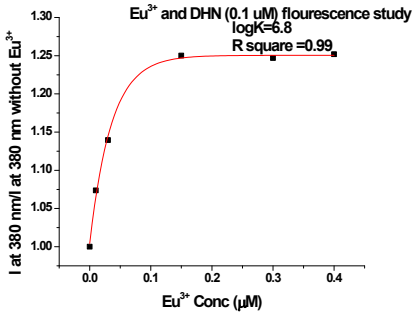

Figure S5 Fluorescence titration curve of Eu^{3+} and DHN

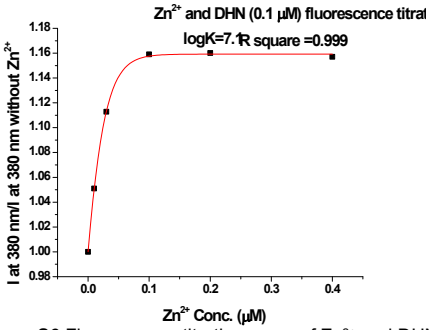

Figure S6 Fluorescence titration curve of Zn^{2+} and DHN

(1) C. Xu, C. Zhao, J. Ren and X. Qu, *Chem. Commun.*, 2011, **47**, 8043.