Supplementary Information

Striking Solvent Dependence of Total Emission and Circularly Polarised Luminescence in Coordinatively Saturated Chiral Europium Complexes: Solvation Significantly Perturbs the Ligand Field

Jack D. Fradgley, Andrew T. Frawley, Robert Pal and David Parker*

Department of Chemistry, Durham University, South Road, Durham DH1 3LE, UK

Table S1

| Solvent	Reichardt solvent polarity parameter, E_T^N	Viscosity at 25 °C / mPa s
Water	1.000	0.890
2,2,2-Trifluoroethanol (TFE)	0.898	1.84
Methanol (MeOH)	0.762	0.544
Ethanol (EtOH)	0.654	1.074
Isopropanol (^{i}PrOH)	0.546	2.038
Acetonitrile (MeCN)	0.460	0.369
Dimethylsulfoxide (DMSO)	0.444	1.987
N,N-Dimethylformamide (DMF)	0.404	0.794
Tert-butanol (^{t}BuOH)	0.389	4.312
Acetone	0.355	0.306
Dichloromethane (DCM)	0.309	0.413
Chloroform	0.259	0.537
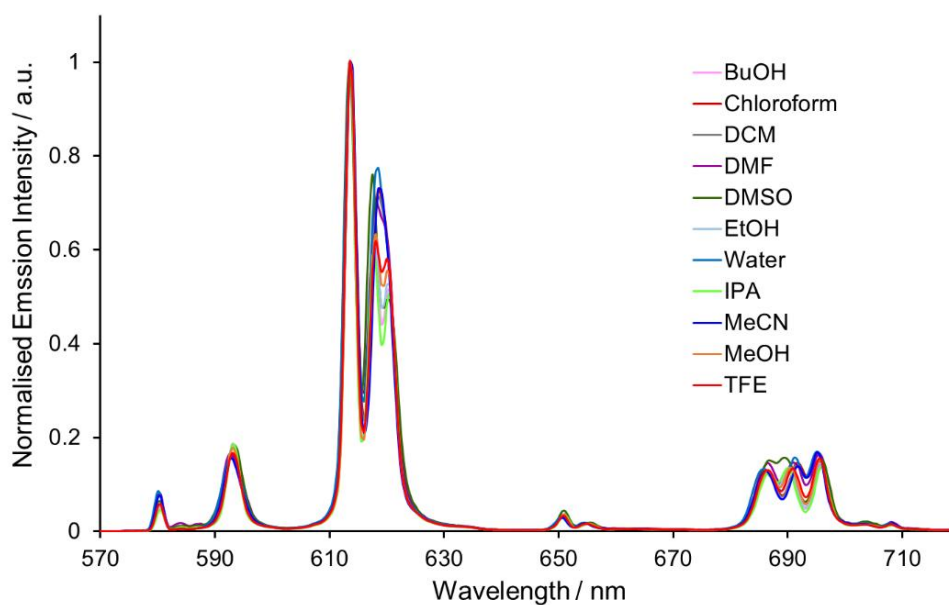
Figure S1 Total emission spectra of [EuL[1]] in various solvents after addition of TFA (295 K, excitation at the absorption maximum value in each solvent).
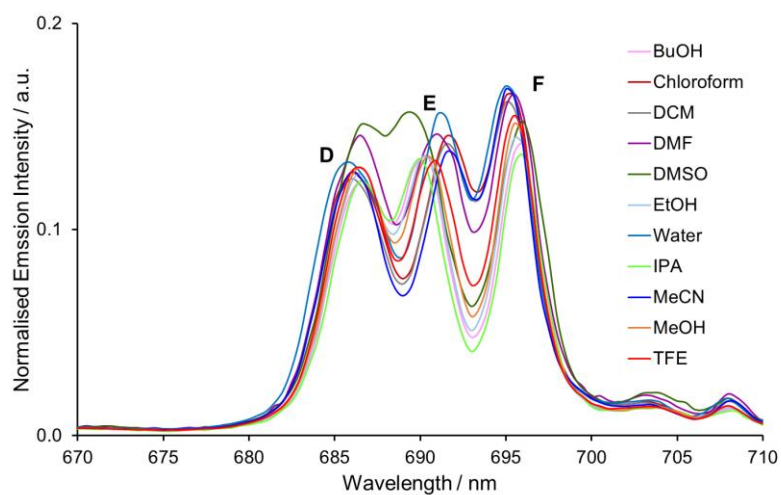

Figure S2 Expanded emission spectra of [EuL[1]] in various solvents following addition of TFA, showing the $\Delta J = 4$ manifold. Transitions are labelled as described in the text.
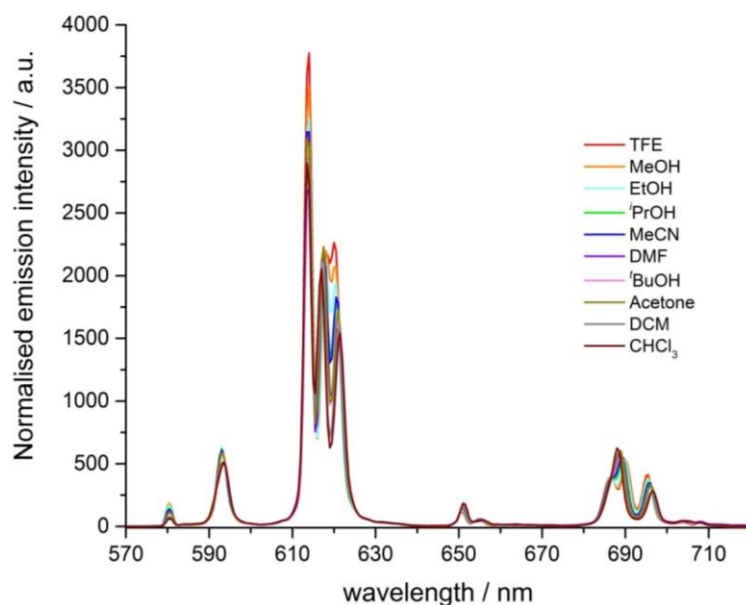
Figure S3a The total emission spectra of [EuL^2] in the stated solvents (295 K, excitation at absorption maximum). Spectra are normalised to the emission intensity of $\Delta J = 1$ manifold.
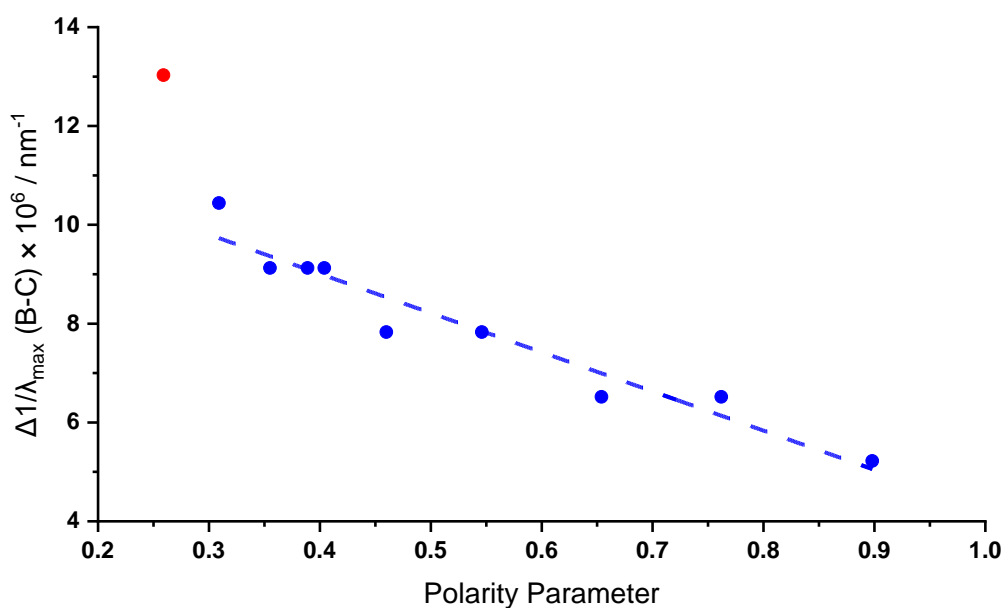

Figure S3b Plot of the difference in frequency of the B and C $\Delta J = 2$ transitions as a function of the normalised Reichardt polarity parameter, in [EuL^2] ($R^2 = 0.93$). The fit excludes the point for chloroform (shown in red) due to the anomalous behaviour seen specifically for this solvent (see discussion in main text).
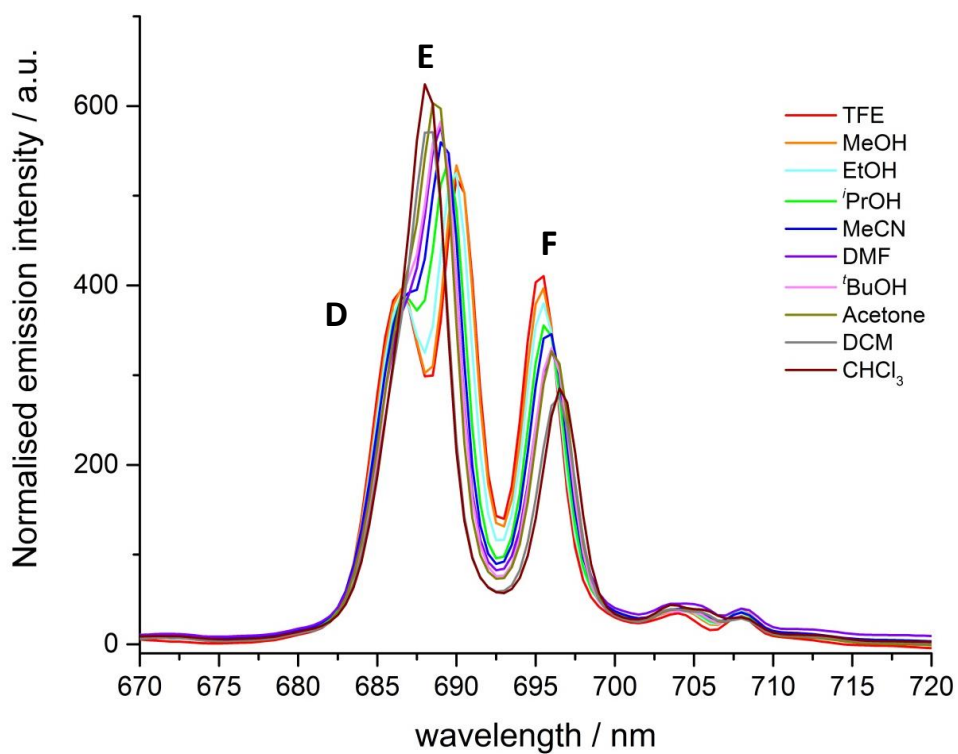
Figure S4 Expanded emission spectra of [EuL^2] in various solvents in the $\Delta J = 4$ manifold. Transitions are labelled as described in the text.
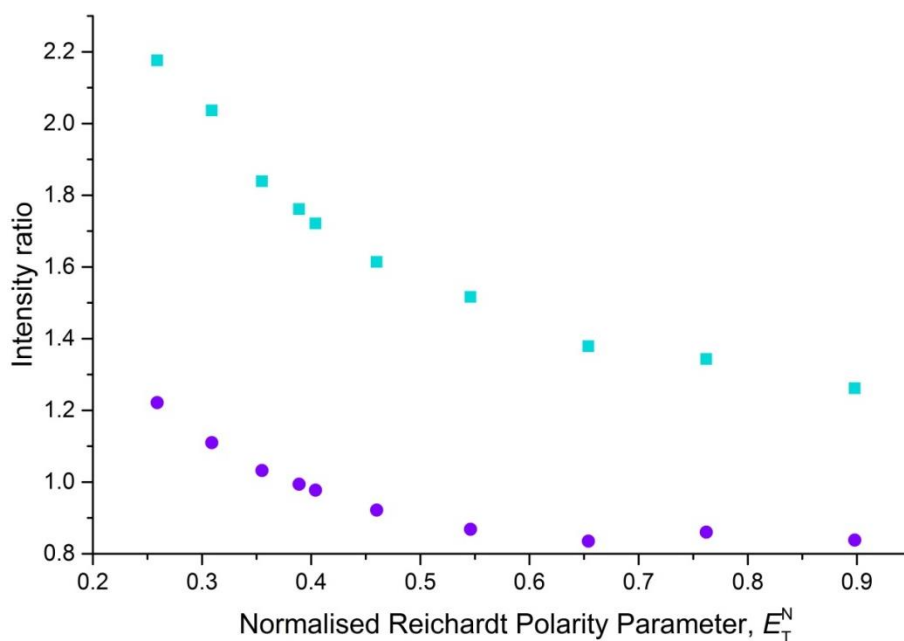

Figure S5 Ratios of the intensity of emissive transitions E vs. F (*light blue*) and E vs. $\Delta J = 1$ at 593 nm (*purple*) as a function of solvent polarity for [EuL^2].

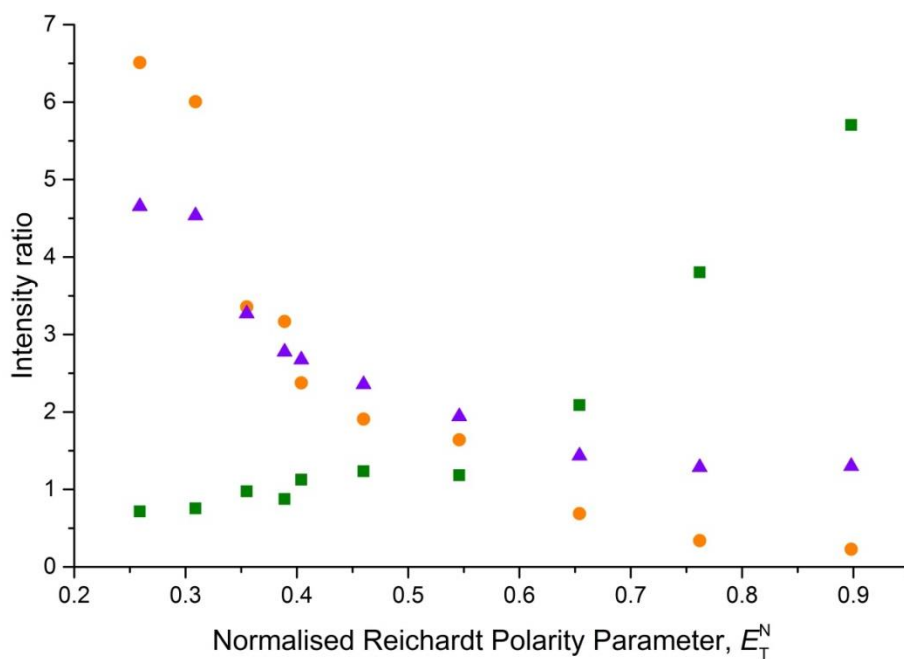**Figure S6** Ratios of the intensity of various CPL transitions as a function of solvent polarity for [EuL^2]: 593 nm / 613 nm (*green*); 593 nm / 690 nm (*purple*); and 613 nm / 690 nm (*orange*).
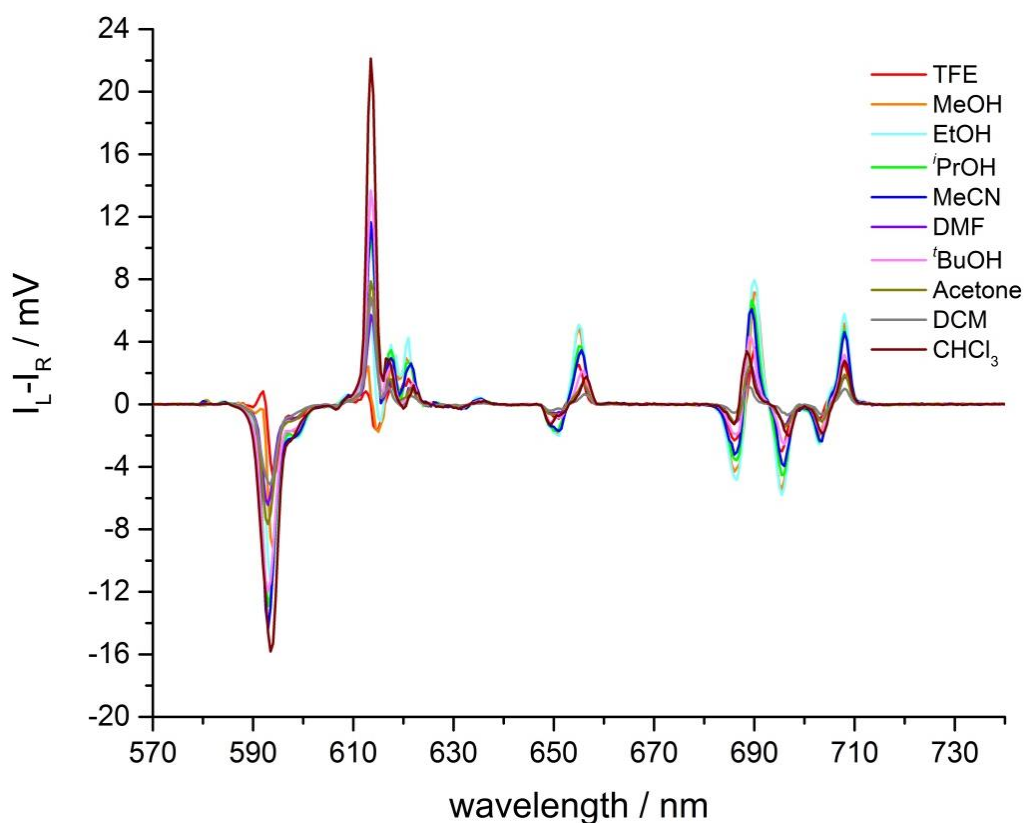

Figure S7 Circularly polarised emission spectra of Λ-[EuL^2] in various solvents (295 K, excitation at absorption maximum in each solvent). Spectra are not normalised.
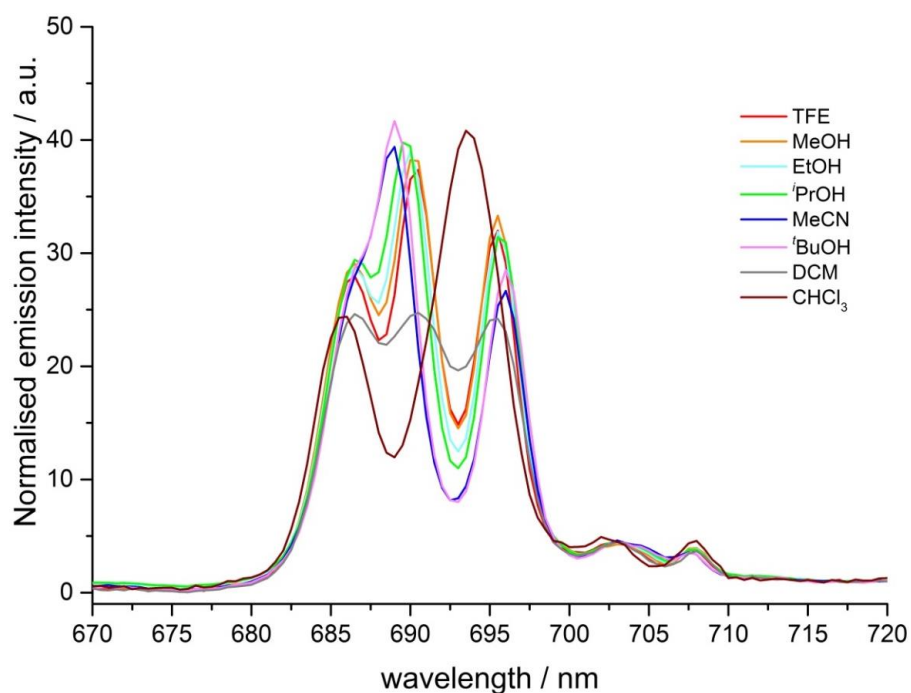
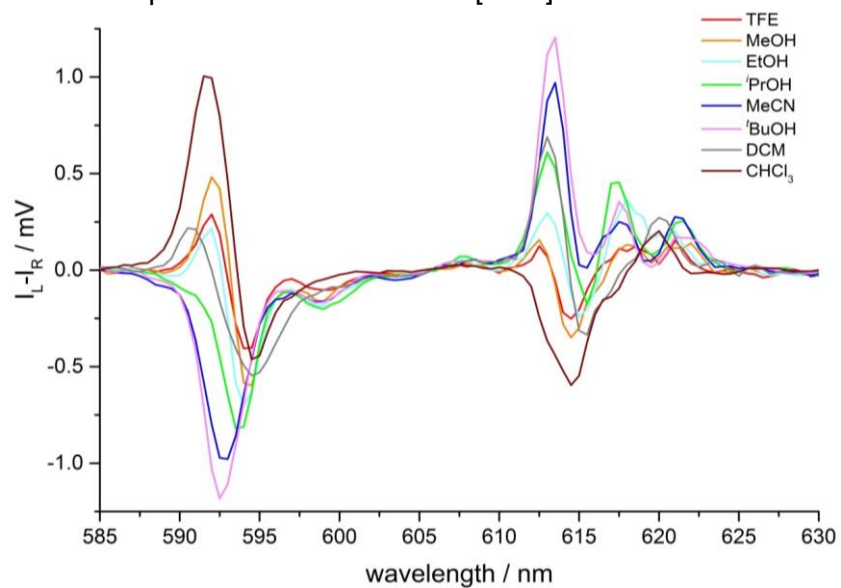**Figure S8** Solvent dependence of emission of [EuL^3] in the $\Delta J = 4$ manifold.

Figure S9 Expanded circularly polarised emission spectra of Λ-[EuL^3] in various solvents highlighting the $\Delta J = 1$ and 2 manifolds, where sign inversion was observed.
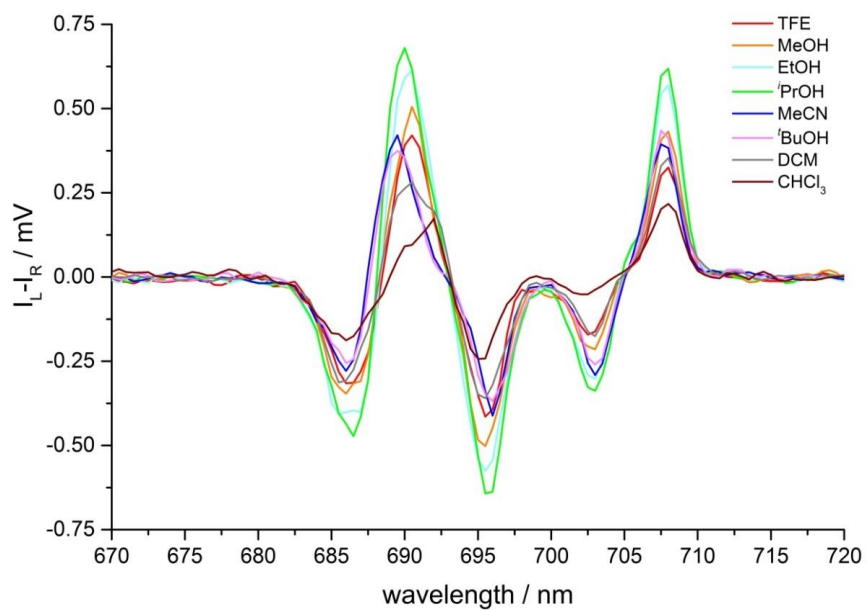
Figure S10 Expanded circularly polarised emission spectra of Λ-[EuL^3] in various solvents examining the $\Delta J = 4$ manifold.