Supporting Information

A heterotrimetallic Ir (III), Au (III) and Pt (II) complex incorporating cyclometallating bi- and tridentate ligands: simultaneous emission from different luminescent metal centres leads to broad-band light emission

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General details

The following palladium catalyst, *trans*-dichlorobis(triphenylphosphine)palladium(II) (Pd(PPh$_3$)$_2$Cl$_2$) was prepared from palladium(II) chloride (PdCl$_2$) according to previously described procedures.$^1$ Palladium(II) chloride (PdCl$_2$), copper(I) iodide (CuI), trimethylsilyl acetylene (TMSA), triethylamine (Et$_3$N) and all other reagents were used as purchased from standard chemical suppliers and used without further purification. TLC was performed on aluminium-backed plates coated with silica gel 60 (230-240 mesh) with F$_{254}$ indicator. The spots were visualized with UV light (254 nm). All column chromatography were performed with silica gel 60 (35-70 μm) from Aldrich. The following known compounds were isolated as pure samples and showed identical NMR spectra to the reported compounds: 8,$^2$ 9,$^3$ 10,$^3$ 11,$^4$ 11,$^3$ 12.$^5$

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\( ^1H \text{ NMR and } ^{13}C \text{ NMR of new compounds} \)
Additional absorption and emission spectra.

![Absorption spectra graph](image)

**Fig. 1.** Absorption spectra of the homonuclear complexes Au (blue line) and Pt, and of the heterodimer AuPt, in CH$_2$Cl$_2$ at 298 K. The dotted line shows the sum of Au+Pt, highlighting the similarity to the spectrum of AuPt.

![Absorption spectra graph](image)

**Fig. 2.** Absorption spectra of the homonuclear complexes Au (blue line) and Ir, and of the heterodimer AuIr, in CH$_2$Cl$_2$ at 298 K. The dotted line shows the sum of Au+Ir, highlighting the similarity to the spectrum of AuIr.
Fig. 3. Absorption spectra of the homonuclear complexes Pt (red line) and Ir, and of the heterodimer PtIr, in CH$_2$Cl$_2$ at 298 K. The dotted line shows the sum of Pt+Ir, highlighting the similarity to the spectrum of Pt+Ir.

Fig. 4. Absorption spectra of the homonuclear complexes Au, Pt and Ir, and of the trinuclear AuPtIr, in CH$_2$Cl$_2$ at 298 K. The dotted line shows the sum of Au+Pt+Ir.
**Fig. 5.** Comparison of the emission spectra of AuPt complex in CH$_2$Cl$_2$ at 298 K (red line) and at 77 K (in diethyl ether / isopentane / ethanol, 2:2:1 by volume; blue line). The dotted line shows the emission of Pt mononuclear complex at 77 K.

**Fig. 6.** Comparison of the emission spectra of AuIr complex in CH$_2$Cl$_2$ at 298 K (red line) and at 77 K (in diethyl ether / isopentane / ethanol, 2:2:1 by volume; blue line). The dotted line shows the emission of Ir mononuclear complex at 77 K.
Fig. 7. Comparison of the emission spectra of IrPt complex in CH$_2$Cl$_2$ at 298 K (red line) and at 77 K (in diethyl ether / isopentane / ethanol, 2:2:1 by volume; blue line). The dotted line shows the emission of Pt mononuclear complex at 77 K.