## Rull, IrIII and OsII mesoionic carbene complexes: efficient catalysts for transfer hydrogenation of selected functionalities

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## **Supporting Information**

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Figure S3. <sup>1</sup>H-<sup>13</sup>C gs-HSQC-NMR spectra of triazolium salt 2 (500 MHz, DMSO-d<sub>6</sub>)



Figure S4. <sup>1</sup>H-<sup>13</sup>C gs-HMBC-NMR spectra of triazolium salt 2 (500 MHz, DMSO-d<sub>6</sub>)



370 360 350 340 330 320 310 300 290 280 270 260 250 240 230 220 210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 Figure S5. <sup>15</sup>N-NMR spectra of triazolium salt **2** (51 MHz, DMSO-*d*<sub>6</sub>)



Figure S6. <sup>1</sup>H–<sup>15</sup>N gs-HMBC-NMR spectra of triazolium salt 2 (500 MHz, DMSO-d<sub>6</sub>)







Figure S9. <sup>1</sup>H-<sup>13</sup>C gs-HSQC-NMR spectra of ruthenium(II) complex Ru<sub>pyrim</sub> (500 MHz, CDCl<sub>3</sub>)



Figure S10. <sup>1</sup>H-<sup>13</sup>C gs-HMBC-NMR spectra of ruthenium(II) complex Ru<sub>pyrim</sub> (500 MHz, CDCl<sub>3</sub>)



350 340 330 320 310 300 290 280 270 260 250 240 230 220 210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 **Figure S11.** <sup>15</sup>N-NMR spectra of ruthenium(II) complex **Ru**<sub>pyrim</sub> (51 MHz, DMSO-*d*<sub>6</sub>)



Figure S12. <sup>1</sup>H–<sup>15</sup>N gs-HMBC-NMR spectra of ruthenium(II) complex Ru<sub>pyrim</sub> (500 MHz, DMSO-d<sub>6</sub>)





Figure S15.  ${}^{1}H-{}^{13}C$  gs-HSQC-NMR spectra of osmium(II) complex Os<sub>pyrim</sub> (400 MHz, CD<sub>2</sub>Cl<sub>2</sub>)



Figure S16. <sup>1</sup>H-<sup>13</sup>C gs-HMBC-NMR spectra of osmium(II) complex Os<sub>pyrim</sub> (400 MHz, CD<sub>2</sub>Cl<sub>2</sub>)



Figure S17. <sup>15</sup>N-NMR spectra of osmium(II) complex Os<sub>pyrim</sub> (41 MHz, CD<sub>2</sub>Cl<sub>2</sub>)



Figure S18. <sup>1</sup>H-<sup>15</sup>N gs-HMBC-NMR spectra of osmium(II) complex Os<sub>pyrim</sub> (400 MHz, CD<sub>2</sub>Cl<sub>2</sub>)



Figure S19. ESI-MS of the crude mixture for the attempted synthesis of  $Ir_{pyrim}$