Supplementary Material 2

Ru (II)-N-Heterocyclic Carbene Complexes: Synthesis, Characterization, Transfer Hydrogenation Reactions and Biological determination

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1,3-Bis-(3,5-dimethylbenzyl)-5,6-dimethylbenzimidazolium bromide, 1a

Figure S1: $^1$H NMR spectra of benzimidazolium salt 1a (CDCl$_3$, 300MHz).

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Figure S2: $^{13}$C NMR spectra of benzimidazolium salt 1a (CDCl$_3$, 75MHz).

Figure S3: DART-TOF-MS of benzimidazolium salt 1a.

1, 3-Bis (4-methylbenzyl)-5,6-dimethyl benzimidazoliumbromide, 1b
Figure S4: $^1$HNMR spectra of benzimidazolium salt 1b (CDCl$_3$, 300MHz).

Figure S5: $^{13}$CNMR spectra of benzimidazolium salt 1b (CDCl$_3$, 75MHz).
Figure S6: DART-TOF-MS of benzimidazolium salt 1b.

1, 3-Bis (4-tet-buthylbenzyl) - 5,6-dimethyl benzimidazolium bromide, 1c

Figure S7: $^1$HNMR spectra of benzimidazolium salt 1c (CDCl$_3$, 300MHz).
Figure S8: $^{13}$CNMR spectra of benzimidazolium salt 1c (CDCl$_3$, 75MHz).

1-(3,5-dimethylbenzyl)-3-(2,3,5,6-tetramethylbenzyl)-5,6-dimethylbenzimidazolium chloride, 1d

Figure S9: $^1$HNMR spectra of benzimidazolium salt 1d (CDCl$_3$, 300MHz).
Figure S10: $^1$CNMR spectra of benzimidazolium salt 1d (CDCl$_3$, 75MHz).

$1-(3,5$-dimethylbenzyl)-$3$-(4-tet-buthylbenzyl)$-5,6$-dimethylbenzimidazolium bromide, 1e

Figure S11: $^1$HNMR spectra of benzimidazolium salt 1e (CDCl$_3$, 300MHz).
Figure S12: $^{13}$CNMR spectra of benzimidazolium salt 1e (CDCl$_3$, 75MHz).

$^{1}$-(3,5-dimethylbenzyl)-3-(4-methylbenzyl)-5,6-dimethyl benzimidazolium bromide, 1f

Figure S13: $^1$HNMR spectra of benzimidazolium salt 1f (CDCl$_3$, 300MHz).
Figure S14: $^{13}$CNMR spectra of benzimidazolium salt 1f (CDCl$_3$, 75MHz).

*Bromo-[1,3-Bis (3,5-dimethylbenzyl) benzimidazole-2-ylidene] silver (I), 2a*
Figure S15: $^1$HNMR spectra of Ag(I)-N-Heterocyclic Carbene complexes 2a(CDCl$_3$, 300MHz).

Figure S16: $^{13}$CNMR spectra of Ag(I)-N-Heterocyclic Carbene complexes 2a(CDCl$_3$, 75MHz).

Bromo-[1,3-Bis (4-methylbenzyl) benzimidazole-2-ylidene] silver (I), 2b
Figure S17: $^1$HNMR spectra of Ag(I)-N-Heterocyclic Carbene complexes 2b (CDCl$_3$, 300MHz).

Figure S18: $^{13}$CNMR spectra of Ag(I)-N-Heterocyclic Carbene complexes 2b (CDCl$_3$, 75MHz).

Bromo-[1, 3- Bis-(4-tert-buthylbenzyl) benzimidazole-2-ylidene] silver (I), 2c
Figure S19: $^1$HNMR spectra of Ag(I)-N-Heterocyclic Carbene complexes 2c (CDCl$_3$, 300MHz).

Figure S20: $^{13}$CNMR spectra of Ag(I)-N-Heterocyclic Carbene complexes 2c (CDCl$_3$, 75MHz).
Chloro-[1-(3,5-dimethylbenzyl)-3-(2,3,5,6-tetramethylbenzyl) benzimidazole-2-ylidene] silver (I), 2d

Figure S21: $^1$HNMR spectra of Ag(I)-N-Heterocyclic Carbene complexes 2d (CDCl$_3$, 300MHz).

Bromo-[1-(3,5-dimethylbenzyl)-3-(4-tert-butylbenzyl) benzimidazole-2-ylidene] silver (I), 2e

Figure S22: $^1$HNMR spectra of Ag(I)-N-Heterocyclic Carbene complexes 2e (CDCl$_3$, 300MHz).
Figure S23: $^{13}$C{\textsc{Nmr}} spectra of Ag(I)-N-Heterocyclic Carbene complexes 2e (CDCl$_3$, 75MHz).

*Bromo-[1-(3,5-dimethylbenzyl)-3-(4-methylbenzyl) benzimidazole-2-ylidene]silver (I), 2f*

Figure S24: $^1$H{\textsc{Nmr}} spectra of Ag(I)-N-Heterocyclic Carbene complexes 2f (CDCl$_3$, 300MHz).
Figure S25: $^{13}$CNMR spectra of Ag(I)-N-Heterocyclic Carbene complexes $2f$ (CDCl$_3$, 75MHz).

Dichloro-[1,3-bis(4-methylbenzyl)benzimidazol-2-ylidene](p-cymene)-ruthenium(II), $3b$

Figure S29: $^1$HNMR spectra of Ru(II)-N-Heterocyclic Carbene complexes $3b$ (CDCl$_3$, 300MHz).
Figure S30: $^{13}$C NMR spectra of Ru(II)-N-Heterocyclic Carbene complexes 3b (CDCl$_3$, 75MHz).

Dichloro-[1,3-bis(4-tertbuthylbenzyl)benzimidazol-2-ylidene](p-cymene)-ruthenium(II), 3c

Figure S31: FT-IR spectra of Ru(II)-N-Heterocyclic Carbene complexes 3c.
Figure S32: $^1$HNMR spectra of Ru(II)-N-Heterocyclic Carbene complexes 3c (CDCl$_3$, 300MHz).

Figure S32: $^{13}$CNMR spectra of Ru(II)-N-Heterocyclic Carbene complexes 3c (CDCl$_3$, 75MHz).
Dichloro-[1-(3,5-dimethylbenzyl)-3-(2,3,5,6-tetramethylbenzyl)benzimidazol-2-ylidene](p-cymene) ruthenium(II), 3d

Figure S33: $^1$HNMR spectra of Ru(II)-N-Heterocyclic Carbene complexes 3d (CDCl$_3$, 300MHz).
Figure S34: $^{13}$C-NMR spectra of Ru(II)-N-Heterocyclic Carbene complexes 3d (CDCl$_3$, 75MHz).

*Dichloro-[1-(3,5-dimethylbenzyl)-3-(4-tertbuthylbenzyl)benzimidazol-2-ylidene](p-cymene) ruthenium(II), 3e*

Figure S35: $^1$H-NMR spectra of Ru(II)-N-Heterocyclic Carbene complexes 3e (CDCl$_3$, 300MHz).
Figure S36: $^{13}$CNMR spectra of Ru(II)-N-Heterocyclic Carbene complexes 3e (CDCl$_3$, 75MHz).
Dichloro-[1-(3,5-dimethylbenzyl)-3- (4-methylbenzyl)benzimidazol-2-ylidene](p-cymene)-ruthenium(II), 3f

Figure S37: $^1$HNMR spectra of Ru(II)-N-Heterocyclic Carbene complexes 3f (CDCl$_3$, 300MHz).
Figure S38: $^{13}$CNMR spectra of Ru(II)-N-Heterocyclic Carbene complexes 3f (CDCl$_3$, 75MHz).
