Electronic supplementary materials *Mendeleev Commun.*, 2020, **30**, 246–248

Copper(II), cobalt(II), manganese(II) and nickel(II) bis(hexafluoroacetylacetonate) complexes with *N*-vinylimidazole

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IR spectra were recorded on a Bruker Vertex 70 spectrometer in KBr pellets. UV–VIS spectra were recorded on a Perkin–Elmer Lambda 35 spectrophotometer. 1-Vinylimidazole, acetone, and diethyl ether were used as purchased.

*Synthesis of complexes **1–4***: 1-vinylimidazole (66 mg, 0.70 mmol) was added to a stirred solution of the corresponding hexafluoroacetylacetonate (0.30 mmol), $[M(hfac)_2(H_2O)_2]$ (M = Cu, Ni, Mn) or $[Co(hfac)_2(H_2O)_2]\cdot H_2O$, in acetone (2–3 ml). The resulting solution was filtered, and diethyl ether (5 ml) was then layered onto a filtrate. The mixture was kept overnight at room temperature. The precipitated crystals of compounds **1–4** were collected, washed with diethyl ether (1×2 ml), and dried on air.

*Complex **1*** (green prisms). (72% yield). IR (cm^{-1}): 3187, 3172, 3144, 3113, 3070 and 3020 s. (ν_{C-H}), 1656 s. ($\nu_{C=C}$, vinyl group), 1551, 1529, 1517, 1501 and 1496 s. ($\nu_{C=C}$, $\nu_{C=N}$, imidazole) 1256, 1227, 1193, 1156 and 1130 s. ($\nu_{C–F}$, CF_3). Anal. Calcd for $C_{20}H_{14}CuF_{12}N_4O_4$: C, 36.07; H, 2.12; N, 8.41. Found: C, 35.92; H, 2.24; N, 8.25.

*Complex **2*** (orange prisms). (80% yield). IR (cm^{-1}): 3181, 3160, 3139, 3112, 3069 and 3021 s. (ν_{C-H}), 1656 и 1643 s. ($\nu_{C=C}$, vinyl group), 1555, 1527, 1532, 1514 and 1501 s. ($\nu_{C=C}$, $\nu_{C=N}$, imidazole), 1255, 1228, 1193, 1154 and 1134 s. ($\nu_{C–F}$, CF_3). Anal. Calcd for $C_{20}H_{14}CoF_{12}N_4O_4$: C, 36.33; H, 2.13; N, 8.47. Found: C, 36.40; H, 2.31; N, 8.29.

*Complex **3*** (yellow prisms). (78% yield). IR (cm^{-1}): 3180, 3153, 3133, 3110, 3066 and 3021 s. (ν_{C-H}), 1653 and 1649 s. ($\nu_{C=C}$, vinyl group), 1556, 1530, 1513 and 1500 s. ($\nu_{C=C}$, $\nu_{C=N}$, imidazole), 1253, 1228, 1193, 1154 and 1134 s. ($\nu_{C–F}$, CF_3). Anal. Calcd for $C_{20}H_{14}F_{12}MnN_4O_4$: C, 36.55; H, 2.15; N, 8.52. Found: C, 36.44; H, 2.27; N, 8.64.

*Complex **4*** (blue plates) (65% yield). IR (cm^{-1}): 3182, 3162, 3142, 3113, 3071 and 3021 s. (ν_{C-H}), 1656 and 1647 s. ($\nu_{C=C}$, vinyl group), 1554, 1534, 1527, 1515 and 1502 s. ($\nu_{C=C}$, $\nu_{C=N}$, imidazole),

1256, 1228, 1194, 1154 and 1135 s. (ν_{C-F}, CF_3). Anal. Calcd for $C_{20}H_{14}F_{12}N_4NiO_4$: C, 36.34; H, 2.13; N, 8.48. Found: C, 36.26; H, 2.27; N, 8.40.

Table S1 Absorption maxima and molar extinction coefficients of complexes **1–4**.

Compound	λ_{max}/nm and (lgε)						
1	228 (4.76)	310 (4.56)	sh 330 (4.23)	sh 446 (1.54)	743 (1.62)		sh 1034 (1.38)
2	230 (4.74)	301 (4.58)	sh 316 (4.58)		509 (1.79)	sh 550 (1.69)	1089 (0.84)
3	231 (4.77)	308 (4.77)	sh 325 (4.55)	sh 461 (1.76)	637 (1.14)		
4	228 (4.69)	316 (4.51)	sh 334 (4.37)	sh 438 (1.91)	609 (1.2)		1089 (0.85)

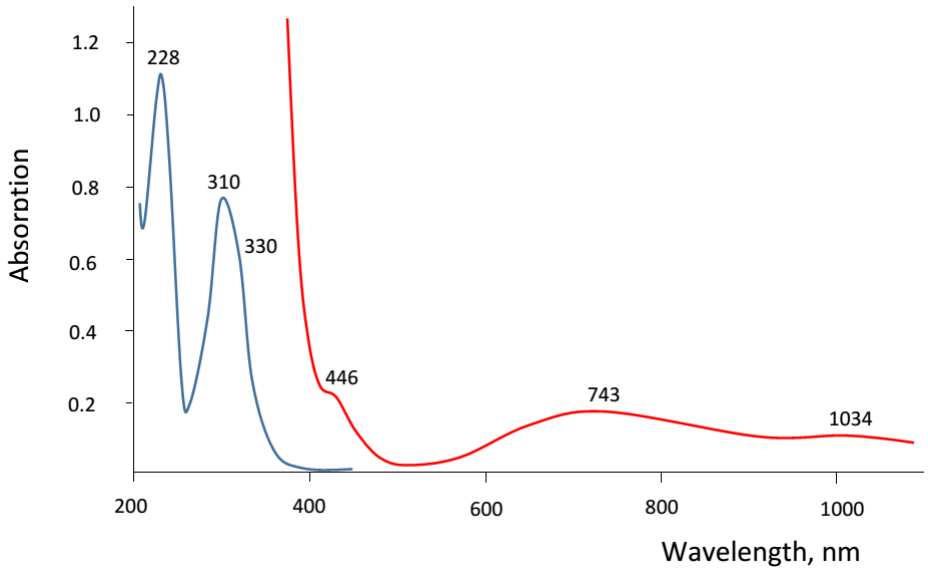

Figure S1 Electronic absorption spectra for MeCN solutions of complex **1**: $c = 1\times10^{-4}$ (blue) and 3.9×10^{-3} (red) mol dm^{-3}.

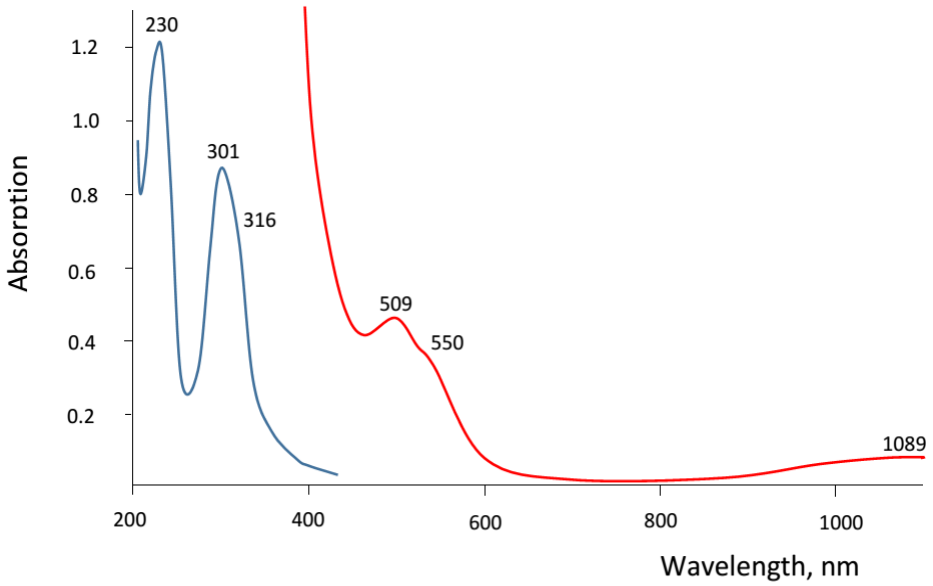

Figure S2 Electronic absorption spectra for MeCN solutions of complex **2**: $c = 2\times10^{-4}$ (blue) and 5.4×10^{-3} (red) mol dm^{-3}.

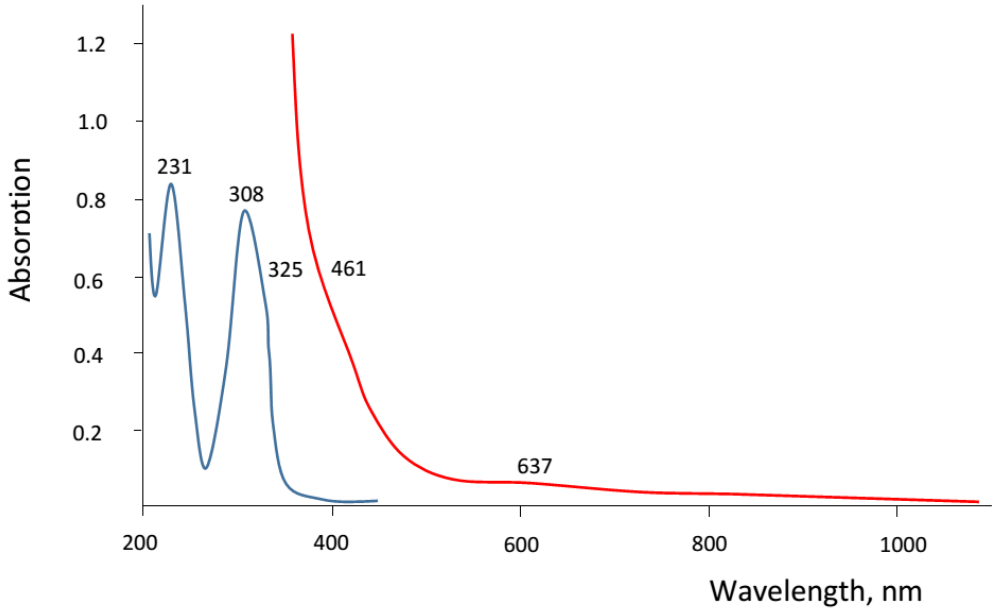

Figure S3 Electronic absorption spectra for MeCN solutions of complex **3**: $c = 1\times10^{-4}$ (blue) and 3×10^{-3} (red) mol dm^{-3}.

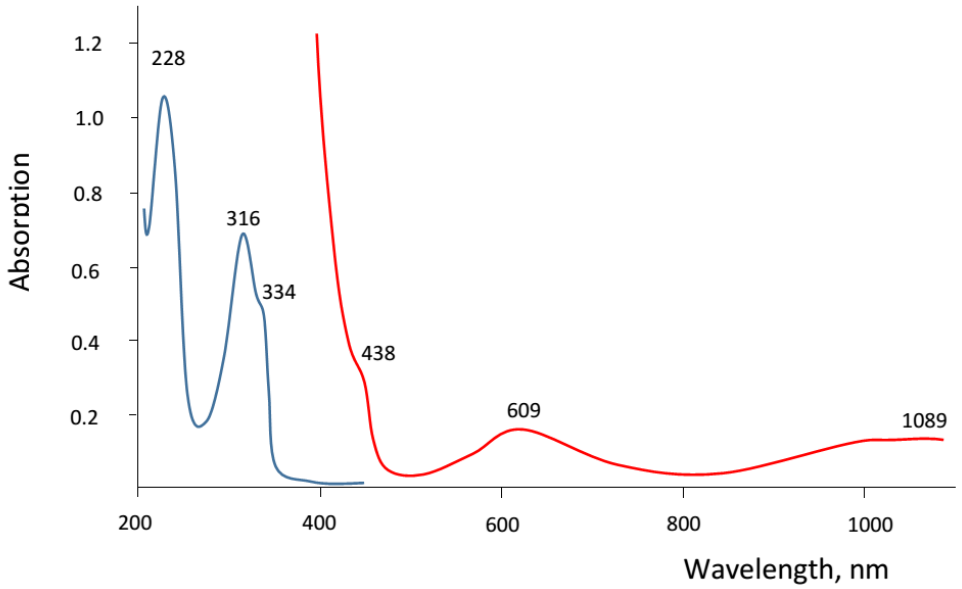

Figure S4 Electronic absorption spectra for MeCN solutions of complex **4**: $c = 1.5\times10^{-4}$ (blue) 5.5×10^{-3} (red) mol dm^{-3}.