Figure S1. Titration curves with S-methyl-L-cysteine for the $\text{H}^+\text{–}$ligand system (a) and the $[(\eta^6\text{-p-cym})\text{Ru(H}_2\text{O})_3]^2^+\text{–}$ligand systems at 1:2 (b), 1:1 (c) and 2:1 (d) ratios. Negative base equivalent refers to an excess of acid in the sample.
Figure S2. Dependence on pH of the $^1$H NMR spectra of the $[(\eta^6-p$-cym)Ru(H$_2$O)$_3$]$^{2+}$–met system at 1:1 ratio and at 298 K in D$_2$O ($I = 0.20$ M KNO$_3$, $c_{Ru} = 15.3$ mM). “Ru” stands for the $[(\eta^6-p$-cym)Ru]$^{2+}$ entity.
Figure S3. Percentage amount of ruthenium(II) in form of various methionato, citrato, isoserinato complexes as a function of pH in a hypothetical Ru–met–citr–ise system at 1:1:1:1 ratio using the previously determined logβ values\textsuperscript{7,9} and the data in Table 2. \(c_{\text{Ru}} = 1 \mu\text{M}\) (a) and 10 mM (b); “Ru” refers to any form of \([(\eta^6-p\text{-cym})\text{Ru}]^{2+}\) entity.
Figure S4. Superimposed molecular structures for the two conformers of the $\text{R}_\text{RuR}_{\alpha\text{C}}\text{S}_\text{s}$ diastereomer of $[\eta^6$-$p$-cym)Ru(mecys)]\text{NO}_3$ (10).
Figure S5. COSY spectra of [(η⁶-p-cym)Ru(mecys)]CF₃SO₃ (12) in CD₃OD (a) and [(η⁶-p-cym)Ru(mecys)]Cl (1) in D₂O (b).
Figure S6. HSQC spectrum of \([(\eta^6-p\text{-cym})\text{Ru(mecys)}]\text{Cl} \ (1) \text{ in } \text{D}_2\text{O}. \text{ The peaks belonging to the major diastereomer are in squares, while the minor’s in circles.}
Figure S7. Newmann projection of the two diastereomers of $[(\eta^6-p$-cym)Ru(mecys)]^+$. 
Figure S8. Dependence on temperature of the $^1$H NMR spectra of [(η⁵-Cp*)Rh(mecys)]Cl (6) in D$_2$O at 298 K (a), at 283 K (b) and at 273 K (c) together with the notation of the hydrogens according to Scheme 1. Resonances of the major diastereomer are marked with ○, while those of the minor one with ▲.
Figure S9. COSY spectra of \([\eta^6\text{-p-cym}]\text{Ru(DL-met)}\)NO\(_3\) (11) in D\(_2\)O at 298K (a) and \([\eta^6\text{-p-cym}]\text{Ru(L-met)}\)Cl (4) in D\(_2\)O at 273K (b). Marked cross peaks originate from ethanol.
Figure S10. HSQC spectrum of [(η⁶-p-cym)Ru(DL-met)]NO₃ (11) in D₂O at 273 K. The peaks belonging to the major diastereomer are in squares, while the minors in circles.
Figure S11. Dependence on temperature of the $^1$H NMR spectra of $[(\eta^5\text{-Cp}^*)\text{Rh(DL-met)}]\text{Cl}$ (7) in D$_2$O at 298 K (a), at 283 K (b) and at 273 K (c) together with the notation of the hydrogens according to Scheme 1. Resonances of the major diastereomer are marked with ○, while those of the minor one with ▲.