SUPPLEMENTARY INFORMATION

Chiral Discrimination in Solid-state Interactions of Cobalt(III)-polyamine Complex Cations with *Tris*-(dipicolinato)lanthanate(III) Anions

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HYDROGEN BOND CONTACTS WITHIN THE LATTICES.

1. 2{Δ,Λ-[Co(en)$_3$]Δ,Λ[La(dipic)$_3$]•4.5H$_2$O} CCDC **777292**

Hydrogen-bond geometry (Å, º)

D—H···*A*	*D*—H	H···*A*	*D*···*A*	*D*—H···*A*
N1—H1*AN*···O01^{i}	0.91	2.39	3.1570 (19)	142
N1—H1*AN*···O02^{ii}	0.91	2.34	3.123 (2)	144
N1—H1*BN*···O14^{iii}	0.91	1.97	2.875 (2)	170
N1—H1*BN*···O13^{iii}	0.91	2.57	3.2563 (18)	133
N2—H2*AN*···O24^{iii}	0.91	2.03	2.8359 (18)	147
N2—H2*BN*···O32^{iv}	0.91	2.53	3.161 (2)	127
N2—H2*BN*···O32	0.91	2.62	3.446 (2)	151
N3—H3*AN*···O23^{iii}	0.91	2.14	2.9462 (17)	148
N3—H3*AN*···O13^{iii}	0.91	2.64	3.2682 (19)	127
N3—H3*BN*···O03^{iii}	0.91	2.29	3.100 (2)	148
N4—H4*AN*···O11	0.91	2.03	2.9049 (17)	160
N4—H4*BN*···O04^{iii}	0.91	2.21	2.977 (2)	141
N5—H5*AN*···O12	0.91	2.05	2.8927 (18)	154
N6—H6*AN*···O01^{i}	0.91	1.97	2.8715 (19)	171
N6—H6*BN*···O32	0.91	2.04	2.945 (2)	173
O01—H011···O02^{v}	0.85 (1)	1.99 (1)	2.735 (2)	146 (2)
O01—H012···O22^{vi}	0.85 (1)	1.88 (1)	2.657 (3)	151 (2)
O01—H012···O22′^{vi}	0.85 (1)	1.94 (1)	2.757 (4)	161 (2)
O02—H021···O03	0.85 (1)	1.99 (1)	2.809 (2)	162 (3)
O02—H022···O34^{vii}	0.85 (1)	1.89 (1)	2.732 (2)	171 (2)
O03—H031···O34	0.85 (1)	2.01 (1)	2.809 (2)	158 (2)
O03—H031···O33	0.85 (1)	2.52 (1)	3.2168 (18)	141 (2)
O03—H032···O14^{v}	0.85 (1)	2.01 (1)	2.8216 (19)	161 (3)
O04—H041···O31^{viii}	0.85 (1)	2.07 (1)	2.873 (2)	156 (3)
O04—H042···O22′^{vi}	0.85 (1)	2.54 (2)	3.270 (5)	145 (2)
O05—H051···O22	0.86 (1)	1.98 (1)	2.810 (4)	164 (2)
O05—H051···O22′	0.86 (1)	2.56 (1)	3.296 (5)	144 (1)

Symmetry codes: (i) *x*, −*y*+2, *z*−1/2; (ii) −*x*+1/2, −*y*+3/2, −*z*+1; (iii) *x*, −*y*+1, *z*−1/2; (iv) −*x*, *y*, −*z*+1/2; (v) −*x*+1/2, *y*+1/2, −*z*+3/2; (vi) *x*, −*y*+1, *z*+1/2; (vii)

−*x*+1/2, *y*−1/2, −*z*+3/2; (viii) −*x*, −*y*+1, −*z*+1.

2. Δ,Λ-[Co(en)$_3$]Δ,Λ-[La(dipic)$_3$]•4H$_2$O **CCDC 777293**

Hydrogen-bond geometry (Å, º)

D—H···*A*	*D*—H	H···*A*	*D*···*A*	*D*—H···*A*
N1—H1*AN*···O3^{i}	0.91	2.22	3.032 (4)	149
N1—H1*AN*···O2^{ii}	0.91	2.63	3.369 (4)	139
N1—H1*BN*···O34	0.91	1.96	2.865 (4)	174
N1—H1*BN*···O33	0.91	2.63	3.294 (4)	130
N2—H2*AN*···O14	0.91	2.00	2.861 (4)	157
N2—H2*BN*···O22^{iii}	0.91	2.50	3.089 (4)	123
N3—H3*AN*···O13	0.91	2.27	3.030 (3)	141
N3—H3*AN*···O33	0.91	2.50	3.151 (4)	129
N3—H3*BN*···O1	0.91	2.18	3.013 (4)	152
N4—H4*AN*···O31^{iv}	0.91	2.06	2.927 (3)	159
N4—H4*BN*···O4	0.91	2.10	2.981 (5)	164
N5—H5*AN*···O32^{iv}	0.91	2.04	2.893 (4)	155
N5—H5*BN*···O24^{i}	0.91	2.52	3.099 (4)	122
N6—H6*AN*···O2^{ii}	0.91	1.95	2.852 (4)	170
N6—H6*BN*···O22^{iv}	0.91	1.98	2.892 (4)	177
O1—H01*A*···O24	0.85 (1)	2.19 (2)	2.947 (4)	148 (3)

O1—H01*A*···O23	0.85 (1)	2.27 (2)	3.040 (4)	151 (3)
O1—H01*B*···O34^{v}	0.85 (1)	2.08 (2)	2.872 (4)	154 (5)
O2—H02*A*···O3^{v}	0.85 (1)	2.06 (2)	2.793 (4)	144 (3)
O2—H02*B*···O12^{iv}	0.85 (1)	1.93 (1)	2.745 (4)	161 (3)
O3—H03*A*···O1	0.85 (1)	2.04 (2)	2.832 (4)	154 (4)
O3—H03*B*···O24^{i}	0.85 (1)	1.88 (2)	2.682 (4)	158 (4)
O4—H04*A*···O21^{iv}	0.85 (1)	2.45 (3)	3.201 (4)	147 (4)
O4—H04*B*···O12^{vi}	0.85 (1)	2.30 (2)	3.123 (4)	162 (5)

Symmetry codes: (i) −*x*+2, *y*−1/2, −*z*+1/2; (ii) *x*, *y*−1, *z*; (iii) −*x*+1, *y*−1/2, −*z*+1/2; (iv) *x*, −*y*+3/2, *z*−1/2; (v) −*x*+2, *y*+1/2, −*z*+1/2; (vi) −*x*+1, *y*+1/2, −*z*+1/2.

3. 2{Δ-[Co(en)$_3$]Δ,Λ-[La(dipic)$_3$]•6.5H$_2$O} CCDC **777294**

Hydrogen-bond geometry (Å, º)

D—H···*A*	*D*—H	H···*A*	*D*···*A*	*D*—H···*A*
N11—H11*C*···O134	0.91	2.27	2.980 (3)	134
N11—H11*C*···O234^{i}	0.91	2.30	3.035 (3)	137
N11—H11*D*···O213^{i}	0.91	2.35	3.199 (3)	156
N11—H11*D*···O233^{i}	0.91	2.51	3.138 (3)	127
N12—H12*C*···O07^{ii}	0.91	2.12	2.982 (3)	157
N12—H12*D*···O112^{ii}	0.91	1.98	2.824 (3)	154
N13—H13*C*···O07^{ii}	0.91	2.36	3.069 (4)	135
N13—H13*D*···O223^{i}	0.91	2.30	3.199 (3)	168
N13—H13*D*···O224^{i}	0.91	2.64	3.379 (4)	139
N14—H14*C*···O09^{ii}	0.91	2.20	2.961 (3)	141
N14—H14*D*···O112^{ii}	0.91	2.05	2.940 (3)	165
N15—H15*C*···O09^{ii}	0.91	2.38	3.095 (3)	136
N15—H15*C*···O224^{i}	0.91	2.40	3.075 (4)	131
N15—H15*D*···O233^{i}	0.91	2.20	3.083 (3)	164
N16—H16*C*···O134	0.91	1.94	2.845 (3)	175
N16—H16*D*···O222	0.91	2.30	3.003 (4)	134
N21—H21*C*···O13^{iii}	0.91	2.33	3.208 (4)	162
N21—H21*D*···O124	0.91	2.25	3.139 (3)	167
N21—H21*D*···O123	0.91	2.58	3.309 (3)	137
N22—H22*C*···O04	0.91	2.23	3.042 (3)	148
N22—H22*D*···O221	0.91	2.18	3.072 (3)	167
N23—H23*C*···O02	0.91	2.04	2.814 (3)	142
N23—H23*D*···O01^{iii}	0.91	2.04	2.863 (3)	149
N23—H23*D*···O124	0.91	2.61	3.044 (3)	110
N24—H24*C*···O212	0.91	2.16	2.879 (3)	136
N24—H24*D*···O08^{iv}	0.91	2.07	2.851 (3)	143
N24—H24*D*···O211	0.91	2.61	3.147 (3)	119
N25—H25*C*···O132^{iii}	0.91	2.05	2.932 (3)	164
N25—H25*D*···O10^{iii}	0.91	2.29	3.145 (4)	156
N26—H26*C*···O11	0.91	2.31	3.134 (4)	150
N26—H26*D*···O211	0.91	2.13	3.002 (3)	160
O01—H011···O05	0.85 (1)	2.00 (1)	2.834 (3)	167 (3)
O01—H012···O224^{v}	0.85 (1)	1.87 (1)	2.714 (3)	178 (4)
O02—H021···O113	0.85 (1)	1.91 (1)	2.743 (3)	167 (4)
O02—H022···O06^{vi}	0.85 (1)	1.96 (1)	2.800 (3)	171 (3)
O03—H031···O04^{vii}	0.85 (1)	1.88 (1)	2.723 (3)	172 (4)
O03—H032···O134	0.85 (1)	1.98 (1)	2.832 (3)	176 (4)
O04—H041···O114	0.85 (1)	1.91 (1)	2.751 (3)	175 (4)
O04—H042···O232	0.85 (1)	1.91 (1)	2.758 (3)	171 (4)
O05—H051···O122^{vii}	0.84 (1)	1.90 (1)	2.748 (3)	178 (4)
O05—H052···O132	0.85 (1)	1.91 (2)	2.728 (3)	161 (4)
O06—H061···O03	0.85 (1)	1.93 (1)	2.776 (3)	175 (4)

O06—H062···O12	0.85 (1)	1.81 (1)	2.660 (3)	176 (4)
O07—H071···O214^{v}	0.85 (1)	2.08 (2)	2.858 (4)	153 (4)
O07—H072···O122	0.85 (1)	2.06 (2)	2.852 (4)	156 (4)
O08—H081···O231^{viii}	0.85 (1)	1.98 (2)	2.785 (3)	159 (5)
O08—H082···O11^{i}	0.85 (1)	2.51 (2)	3.316 (5)	159 (4)
O09—H091···O05	0.86 (1)	1.97 (1)	2.821 (3)	175 (4)
O09—H092···O214^{ix}	0.85 (1)	1.95 (1)	2.795 (3)	169 (4)
O10—H10*E*···O124^{x}	0.85 (1)	1.99 (1)	2.836 (4)	170 (6)
O10—H10*F*···O223^{v}	0.85 (1)	2.20 (2)	3.026 (4)	165 (5)
O11—H11*E*···O13^{iii}	0.85 (1)	2.11 (3)	2.906 (6)	155 (6)
O11—H11*F*···O03	0.85 (1)	2.01 (3)	2.801 (4)	155 (6)
O12—H12*E*···O123	0.85 (1)	1.95 (1)	2.787 (3)	174 (4)
O12—H12*F*···O212^{x}	0.85 (1)	1.92 (1)	2.750 (3)	166 (4)

Symmetry codes: (i) −*x*+1, *y*−1/2, −*z*+1; (ii) −*x*+1, *y*+1/2, −*z*+1; (iii) −*x*+1, *y*+1/2, −*z*; (iv) −*x*+2, *y*+1/2, −*z*+1; (v) *x*, *y*−1, *z*; (vi) *x*+1, *y*, *z*; (vii) *x*−1, *y*, *z*; (viii) −*x*+2, *y*−1/2, −*z*+1; (ix) *x*−1, *y*−1, *z*; (x) −*x*+1, *y*−1/2, −*z*.

4. 2{Δ-[Co(en)$_3$]Δ,Λ-[Gd(dipic)$_3$]•6.5H$_2$O} CCDC **777295**

Hydrogen-bond geometry (Å, º)

D—H···*A*	*D*—H	H···*A*	*D*···*A*	*D*—H···*A*
N11—H11*C*···O134	0.91	2.25	2.964 (3)	135
N11—H11*C*···O234^{i}	0.91	2.28	3.016 (3)	137
N11—H11D···O213i	0.91	2.34	3.211 (3)	160
N11—H11D···O233i	0.91	2.56	3.178 (3)	126
N12—H12C···O07ii	0.91	2.13	2.983 (3)	156
N12—H12D···O112ii	0.91	1.98	2.825 (3)	153
N13—H13C···O07ii	0.91	2.28	3.013 (3)	137
N13—H13D···O223i	0.91	2.26	3.150 (3)	167
N13—H13D···O224i	0.91	2.58	3.316 (3)	138
N14—H14C···O09ii	0.91	2.18	2.948 (3)	141
N14—H14D···O112ii	0.91	2.00	2.885 (3)	165
N15—H15C···O224i	0.91	2.55	3.207 (3)	130
N15—H15C···O09ii	0.91	2.35	3.066 (3)	135
N15—H15D···O233i	0.91	2.17	3.055 (3)	165
N16—H16C···O134	0.91	1.93	2.831 (3)	173
N16—H16D···O222	0.91	2.34	3.048 (3)	134
N21—H21C···O13iii	0.91	2.39	3.269 (4)	162
N21—H21D···O124	0.91	2.19	3.088 (3)	170
N22—H22C···O04	0.91	2.22	3.023 (3)	147
N22—H22D···O221	0.91	2.23	3.125 (3)	167
N23—H23C···O02	0.91	2.00	2.783 (3)	144
N23—H23D···O01iii	0.91	2.04	2.858 (3)	149
N24—H24C···O212	0.91	2.14	2.863 (3)	136
N24—H24D···O211	0.91	2.65	3.188 (3)	118
N24—H24D···O08iv	0.91	2.08	2.857 (3)	142
N25—H25C···O132iii	0.91	2.02	2.898 (3)	161
N25—H25D···O10iii	0.91	2.23	3.082 (4)	156

N26—H26C···O11	0.91	2.34	3.150 (3)	148
N26—H26D···O211	0.91	2.09	2.971 (3)	163
O01—H011···O05	0.85 (1)	1.99 (1)	2.838 (3)	172 (4)
O01—H012···O224v	0.85 (1)	1.88 (1)	2.707 (3)	162 (4)
O02—H021···O113	0.85 (1)	1.89 (1)	2.713 (3)	164 (3)
O02—H022···O06vi	0.85 (1)	1.94 (1)	2.785 (3)	176 (3)
O03—H031···O04vii	0.84 (1)	1.91 (1)	2.716 (3)	159 (2)
O03—H032···O134	0.85 (1)	1.98 (1)	2.817 (3)	169 (4)
O04—H041···O114	0.85 (1)	1.92 (1)	2.754 (3)	166 (3)
O04—H042···O232	0.85 (1)	1.96 (1)	2.755 (3)	155 (2)
O05—H051···O122vii	0.85 (1)	1.90 (1)	2.743 (3)	171 (4)
O05—H052···O132	0.85 (1)	1.92 (1)	2.742 (3)	162 (4)
O06—H061···O03	0.85 (1)	1.92 (1)	2.760 (3)	174 (3)
O06—H062···O12	0.85 (1)	1.83 (1)	2.643 (3)	160 (3)
O07—H071···O214v	0.85 (1)	2.09 (2)	2.899 (3)	158 (4)
O07—H072···O122	0.85 (1)	1.95 (1)	2.788 (3)	172 (3)
O08—H081···O231viii	0.85 (1)	2.03 (2)	2.788 (3)	147 (4)
O08—H081···O232viii	0.85 (1)	2.64 (2)	3.421 (3)	154 (3)
O08—H082···O11i	0.85 (1)	2.29 (1)	3.131 (4)	170 (3)
O09—H091···O05	0.85 (1)	1.96 (1)	2.806 (3)	170 (4)
O09—H092···O214ix	0.85 (1)	1.94 (1)	2.778 (3)	169 (4)
O10—H10E···O124x	0.85 (1)	2.02 (1)	2.862 (3)	174 (4)
O10—H10F···O223v	0.85 (1)	2.45 (1)	3.275 (3)	164 (3)
O10—H10F···O224v	0.85 (1)	2.53 (3)	3.118 (4)	127 (3)
O11—H11E···O13iii	0.85 (1)	2.10 (2)	2.903 (4)	158 (4)
O11—H11F···O03	0.85 (1)	1.96 (1)	2.789 (3)	164 (3)
O12—H12E···O123	0.85 (1)	1.95 (1)	2.790 (3)	168 (4)
O12—H12*E*···O124	0.85 (1)	2.65 (3)	3.313 (3)	136 (4)
O12—H12*F*···O212^{x}	0.85 (1)	1.94 (2)	2.751 (3)	159 (4)
O13—H13*E*···O06^{x}	0.85 (1)	2.04 (2)	2.747 (3)	141 (3)
O13—H13*F*···O10	0.85 (1)	2.10 (1)	2.943 (4)	171 (4)

Symmetry codes: (i) −*x*+1, *y*−1/2, −*z*+1; (ii) −*x*+1, *y*+1/2, −*z*+1; (iii) −*x*+1, *y*+1/2, −*z*; (iv) −*x*+2, *y*+1/2, −*z*+1; (v) *x*, *y*−1, *z*; (vi) *x*+1, *y*, *z*; (vii) *x*−1, *y*, *z*; (viii) −*x*+2, *y*−1/2, −*z*+1; (ix) *x*−1, *y*−1, *z*; (x) −*x*+1, *y*−1/2, −*z*.

5. 2{Δ-[Co(en)$_3$]Δ,Λ-[Gd(dipic)$_3$]•8.5H$_2$O} CCDC **777296**

Hydrogen-bond geometry (Å, º)

D—H···*A*	*D*—H	H···*A*	*D*···*A*	*D*—H···*A*
N11—H11*C*···O221^{i}	0.91	2.12	2.973 (6)	156
N11—H11*D*···O211^{i}	0.91	2.65	3.149 (7)	115
N11—H11D···O212i	0.91	2.59	3.153 (7)	121
N11—H11D···O11ii	0.91	2.07	2.897 (8)	150
N12—H12C···O121	0.91	2.66	3.363 (6)	135
N12—H12C···O131	0.91	2.42	3.153 (6)	137
N13—H13C···O122	0.91	2.19	3.045 (7)	157
N13—H13D···O11ii	0.91	2.42	2.969 (7)	119

N13—H13D···O16iii	0.91	2.47	3.237 (7)	143
N14—H14C···O07iv	0.91	2.05	2.923 (6)	160
N14—H14D···O132	0.91	1.93	2.811 (8)	163
N15—H15C···O232v	0.91	2.53	3.175 (7)	128
N15—H15D···O212i	0.91	1.95	2.844 (7)	168
N16—H16C···O222i	0.91	2.03	2.915 (7)	164
N16—H16D···O16	0.91	2.00	2.809 (7)	147
N21—H21C···O114	0.91	2.23	3.031 (7)	147
N21—H21D···O10vi	0.91	2.27	3.115 (7)	155
N22—H22C···O06	0.91	2.38	3.085 (8)	134
N22—H22C···O09	0.91	2.64	3.379 (8)	139
N22—H22D···O134	0.91	1.87	2.765 (7)	166
N23—H23C···O09	0.91	1.98	2.880 (7)	170
N23—H23D···O224vii	0.91	2.57	3.074 (7)	116
N23—H23D···O10vi	0.91	2.33	3.155 (9)	152
N24—H24C···O214vii	0.91	2.13	3.019 (7)	165
N24—H24D···O134	0.91	2.35	3.141 (7)	146
N25—H25C···O213vii	0.91	2.31	3.218 (7)	172
N25—H25C···O214vii	0.91	2.64	3.294 (8)	130
N25—H25D···O06vi	0.91	2.54	3.297 (9)	141
N25—H25D···O10vi	0.91	2.24	2.992 (8)	140
N26—H26C···O113	0.91	2.55	3.286 (8)	139
N26—H26C···O133	0.91	2.42	3.001 (7)	122
N26—H26D···O03	0.91	2.19	3.068 (8)	163
O01—H01E···O09iv	0.85	1.94	2.774 (7)	167
O01—H01F···O214vii	0.85	1.89	2.700 (6)	160
O02—H02E···O12	0.85	1.85	2.700 (5)	174
O02—H02F···O122i	0.85	1.91	2.758 (6)	173
O03—H03E···O123	0.85	1.99	2.815 (6)	162
O03—H03F···O01	0.85	2.02	2.776 (7)	148
O04—H04E···O113	0.85	1.96	2.810 (7)	174
O04—H04F···O224	0.85	1.98	2.803 (6)	162
O05—H05E···O112	0.85	2.14	2.956 (6)	162
O05—H05F···O132viii	0.85	1.95	2.788 (6)	168
O06—H06E···O10	0.85	2.45	2.940 (7)	117
O06—H06F···O234ix	0.85	1.94	2.769 (8)	166
O07—H07E···O112	0.85	1.94	2.780 (6)	170
O07—H07F···O13ii	0.85	1.94	2.732 (7)	154
O08—H08E···O03	0.85	2.31	2.871 (7)	123
O08—H08F···O234x	0.85	2.04	2.798 (7)	148
O09—H09E···O08viii	0.85	1.91	2.712 (7)	157
O09—H09F···O04vii	0.85	2.00	2.670 (6)	135
O10—H10E···O17	0.85	1.93	2.683 (6)	148
O10—H10F···O223ix	0.85	1.92	2.742 (6)	163

O11—H11E···O02	0.85	2.04	2.807 (6)	150
O11—H11F···O05	0.85	2.17	2.800 (7)	130
O12—H12*E*···O07	0.85	2.01	2.801 (6)	155
O12—H12*F*···O231^{i}	0.85	2.10	2.875 (6)	151
O13—H13*E*···O02	0.85	1.92	2.757 (6)	168
O13—H13*F*···O232^{ix}	0.85	2.08	2.804 (6)	142
O14—H14*E*···O08	0.85	2.40	2.974 (6)	126
O14—H14*F*···O124^{xi}	0.85	2.11	2.900 (7)	155
O15—H15*E*···O112	0.85	2.04	2.795 (6)	148
O15—H15*F*···O16	0.85	1.97	2.726 (9)	148
O16—H16*E*···O132	0.85	2.54	3.326 (7)	154
O16—H16*F*···O212^{x}	0.85	1.96	2.764 (6)	158
O17—H17*E*···O01^{xi}	0.85	2.07	2.843 (7)	151
O17—H17*F*···O14	0.85	2.12	2.745 (9)	130

Symmetry codes: (i) −*x*+1, *y*+1/2, −*z*+2; (ii) −*x*+1, *y*−1/2, −*z*+2; (iii) −*x*, *y*−1/2, −*z*+2; (iv) *x*−1, *y*, *z*; (v) −*x*, *y*+1/2, −*z*+2; (vi) −*x*+1, *y*−1/2, −*z*+1; (vii) −*x*+1,

y+1/2, −*z*+1; (viii) *x*+1, *y*, *z*; (ix) *x*, *y*+1, *z*; (x) *x*−1, *y*+1, *z*; (xi) −*x*, *y*+1/2, −*z*+1.

6. Δ-[Co((NO$_2$)$_2$sar)]Λ-[Gd(dipic)$_3$]•12H$_2$O CCDC **777297**

Hydrogen-bond geometry (Å, º)

D—H···*A*	*D*—H	H···*A*	*D*···*A*	*D*—H···*A*
N3*A*—H3*A*···O03^{i}	0.91	2.06	2.92 (2)	157
N3*A*′—H3*A*′···O03′	0.91	2.04	2.89 (2)	156
N3*B*—H3*B*···O04^{ii}	0.91	2.04	2.864 (10)	151
N3*C*—H3*C*···O12^{iii}	0.91	2.05	2.875 (7)	150

Symmetry codes: (i) *y*, *x*, −*z*+1; (ii) *x*−1, *y*−1, *z*; (iii) −*x*+1, −*x*+*y*+1, −*z*+2/3.