

Additivity of Vicinal Circular Dichroism Contributions from Different Ligands in a Cobalt(III) Complex without Configurational Chirality

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The present communication is concerned with the additivity of the vicinal CD contributions of *trans*(*N*)-[Co(L- or D-alada)(L-ala)]⁻, which have no chiral configuration around the central cobalt(III) ion in the first approximation. Three new complexes, *trans*(*N*)-K[Co(L-alada)(gly)]·H₂O, *trans*(*N*)-K[Co(L-alada)(L-ala)]·2H₂O and *trans*(*N*)-K[Co(D-alada)(L-ala)]·2H₂O, were prepared and separated by the method similar to that of *trans*(*N*)-K[Co(ata)(L-ala)]·2.5H₂O.¹

The geometrical structure of these complexes was confirmed to be *trans*(*N*) one on the basis of their visible absorption spectra and from the ion-exchange column chromatographic behavior. Three geometrical isomers concerning the position or orientation of a methyl group of the coordinated L- or D-alada are possible for each of the present complexes. The NMR spectra confirmed that the complexes obtained here commonly have only one type of geometrical structure and no indication was obtained for the isolation of the other two isomers.

The good agreement of the observed CD curves (3 and 4) with the calculated ones (5 and 6) substantiates the additivity of the two vicinal contributions from the quadridentate ligand, L- or D-alada, and from the L-alaninate ligand. This result indicates that each of the asymmetric carbon atoms of the two

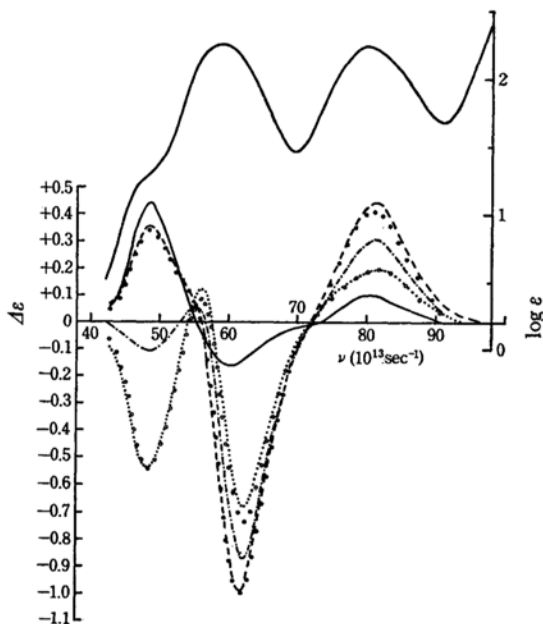


Fig. 1. Absorption and CD curves of *trans*(*N*)-[Co(O)₄(N)₂] type complexes.

Absorption curve: —, [Co(L-alada)(gly)]⁻, CD curves: (1) ----, [Co(ata)(L-ala)]⁻; (2) —, [Co(L-alada)(gly)]⁻; (3) ····, [Co(L-alada)(L-ala)]⁻; (4) - · - ·, [Co(D-alada)(L-ala)]⁻; (5) ····, calculated curve, (1)+(2); (6) - · - · - ·, calculated curve, (1)-(2).

1) N. Koine, N. Sakota, J. Hidaka and Y. Shimura, This Bulletin, **42**, 1583 (1969).

*1 The following abbreviations are used for the ligands. gly: glycinate ion, L-ala: L-alaninate ion, ata: ammoniatricacetate ion, L- or D-alada: L- or D-alaninate-*N,N*-diacetate ion.

optically active ligands independently contribute to the optical activity of the complex ion.