

INORGANIC CHEMISTRY

San Francisco
Meeting

Time Required: 15 Min

TITLE OF PAPER Solution Structure of Mono- and Disubstituted
Pentakis(arylisocyanide)cobalt(I) Complexes

AUTHORS

Underline name of speaker

Complete Business Mail Address

*List address only once if all authors
at same address*

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Plan ACS _____ nonACS publication. Where? Zeitschrift für Naturforschung No _____ Uncertain _____

Presentation requires projector: 2x2" (35 mm) 3 1/4 x 4" (standard) _____ Overhead _____ Vu-Graph _____ Film: 8 mm _____
16 mm _____ Sound _____ Other equipment (specify) _____

ABSTRACT. 200 words or equivalent. TITLE OF PAPER, Authors' Names, Addresses with Zip Code, One-Line Space.
Abstract. Single-space typing. Use full width of ruled area below.

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SOLUTION STRUCTURE OF MONO- AND DISUBSTITUTED PENTAKIS(ARYLISOCYANIDE)-
COBALT(I) COMPLEXES. Clifford A.L. Becker, Department of Chemistry, the American
University of Beirut, Beirut, LEBANON; and George C. Papavassiliou, Physical Chemistry
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The $\nu(-N\equiv C)$ for twenty-eight mono- and disubstituted pentakis(arylisocyanide)cobalt(I)
complexes are investigated by IR and Raman spectroscopy in CH_2Cl_2 -solution at 25 C°. Inverse application of Angular-Overlap approximation is made to help identify the pro-
posed structures. The $[Co(CNR)_4L]X$, $L = P(OPh)_3$, $P(OC_6H_4Cl-p)_3$; $X = ClO_4$, BF_4 ; are
interpreted as C_{3v} axially-substituted trigonal bipyramidal, but increase of the $\angle PCoC$
(equatorial) and Co-C(axial) bond length are suggested. The $[Co(CNR)_3L_2]X$, $L = P(OMe)_3$,
 $P(OEt)_3$, $P(OPr-i)_3$; are interpreted as C_{2v} -distorted axially-disubstituted trigonal
bipyramidal, in which one equatorial $\angle CCoC$ is diminished to allow increased $d_{\pi} \rightarrow \pi^*$ -accept-
ance through Co $3d_{x^2-y^2}$. The $\angle PCoP$ is probably linear but the unique Co-C(equatorial)
bond could be shortened. The $[Co(CNR)_3(PPh_3)_2]X$ are also interpreted as C_{2v} -distorted
trigonal bipyramidal, but with larger distortions as befits decreasing $d_{\pi} \rightarrow \pi^*$ accepting
ability: $RNC > P(OMe)_3 > PPh_3$. The $[Co(CNR)_4PPh_3]X$ are interpreted as C_s -distorted
axially-substituted trigonal bipyramidal through spectra analogy with PPh_3 -disubstituted
complexes and dissimilarity with C_{3v} $[Co(CNR)_4L]X$. The $[Co(CNPh)_3L_2]X$, $L = P(OPh)_3$,
 $P(OC_6H_4Cl-p)_3$; are different in solution than crystalline state, but clearly not D_{3h}
axially-disubstituted trigonal bipyramidal. A C_s axial-equatorial disubstituted
trigonal bipyramidal solution-structure is tentatively suggested.

