When two or more compounds have the same empirical formula but different structures, we call the compounds isomers. Consider the data shown here, which provides five examples of isomers.

compound	empirical formula	free chlorides	ions/metal	color	ion charge
a	$CoCl_2(NH_3)_5NO_2$	2	3	mustard	—
b	$CoCl_2(NH_3)_5NO_2$	2	3	dark orange	—
c	$CrCl_3(H_2O)_6$	3	4	violet	—
d	$CrCl_3(H_2O)_6$	2	3	light green	—
e	$CrCl_3(H_2O)_6$	1	2	dark green	—
f	$CoCl(NH_3)_4(SCN)(NO_2)$	0	2	—	—
g	$CoCl(NH_3)_4(SCN)(NO_2)$	1	2	—	—
h	$Pt_2Cl_4(NH_3)_4$	0	2	—	+1, –1
i	$Pt_2Cl_4(NH_3)_4$	0	2	—	+2, –2
j	$CoCl_3(NH_3)_4$	1	2	violet	
k	$CoCl_3(NH_3)_4$	1	2	green	

Cobalt and chromium have +3 oxidation states in all compounds; platinum has an oxidation state of +2 in both (h) and (i).

What do you make of the data in this table? Can you identify the structural formulas for these compounds? What questions do the data raise for you?

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