Ch112
In class exercise
Nov. 19, 2015

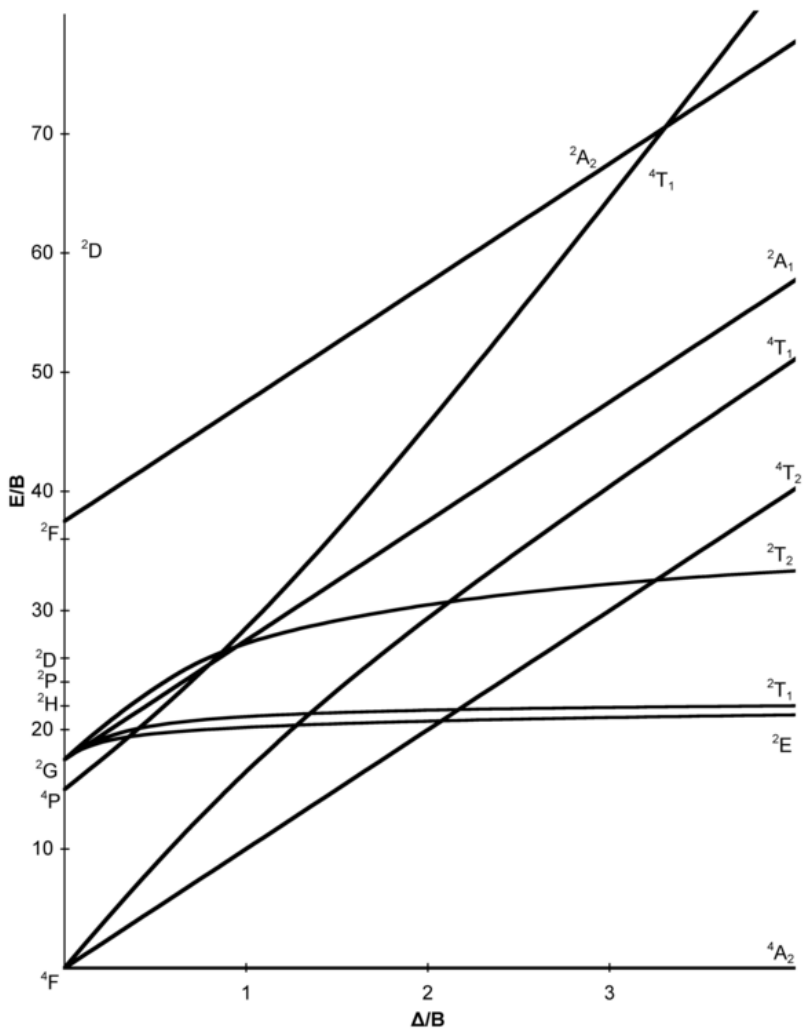
Consider $Mn(OAc)_2$, $KMnO_4$, and $TiCl_3$.

1. For all three compounds, provide the oxidation state, d-electron count, and the term symbol of the free ion ground state.

$Mn(OAc)_2$: Mn(II), d^5, ^6S
$KMnO_4$: Mn(VII), d^0, ^1S
$TiCl_3$: Ti(III), d^1, ^2D

2. Identify the flask containing the respective compounds. Explain.

$Mn(OAc)_2$: nearly colorless. Transition is both spin and Laporte forbidden.
$KMnO_4$: deep purple. Fully allowed.
$TiCl_3$: Faint red. Transition is spin allowed but Laporte forbidden.

3. For which transition metal complexes is the correlation diagram shown below appropriate for spectroscopic analysis? How many spin allowed transitions would you expect? **3**

Cr(acac)3	$[NiCl_4]^{2-}$	$[Co(NH_3)_6]^{3+}$	**$[CoCl_4]^{2-}$**
$[FeBr_4]^-$	WCl_6	$[Fe(CN)_6]^{4-}$	$[V(H_2O)_6]^{3+}$