

Answer on Question #54386 – Chemistry – Inorganic Chemistry

Question:

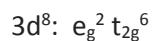
What would be the calculated magnetic moment of $[\text{Ni}(\text{H}_2\text{O})_6]^{2+}$?

Answer:

The magnetic moment (spin only) for Ni^{2+} ion can be found according to the equation:

$\mu = [n(n+2)]^{1/2}$, where n – the number of unpaired electrons.

Being in octahedral coordination environment, Ni(II) has the following electronic configuration of d-electrons:



Thus, electrons sitting on the e_g are unpaired, and those, which are on the t_{2g} , form 3 pairs. Therefore, the number of unpaired electrons is only 2.

Finally, the magnetic moment equals:

$$\mu = [2(2+2)]^{1/2} = 2.83 \mu_B \text{ (the Bohr magneton)}$$