Answer on the question #47047, Chemistry, Other

Question

The chemical formula of a hydrate can be determined by analyzing the percent water in the hydrate, i.e. the ratio of the mass of water lost upon heating divided by the mass of the original hydrate. Use the hydrate manganese(II) chloride tetrahydrate to answer the following questions. (Round your answer to 2 decimal places.)

(a) What is the anhydrous mass of manganese(II) chloride tetrahydrate?
g/mol

(b) What is the mass of the water of manganese(II) chloride tetrahydrate?
g/mol

Please provide the solution.
(c) What is the total mass of manganese(II) chloride tetrahydrate?
g/mol

(d) What is the % water in manganese(II) chloride tetrahydrate?

Answer

(a) The mass of anhydrous manganese(II) chloride tetrahydrate is:

$$M(MgCl_2) = M(Mg) + 2M(Cl) = 95.21\ g/mol$$

(b) The mass of the water if manganese(II) chloride tetrahydrate is:

$$M(H_2O) = 4 * 18.02 = 72.08\ g/mol$$

(c) The total mass of manganese(II) chloride tetrahydrate **is:**

$$M(MgCl_2 * 4H_2O) = M(MgCl_2) + M(H_2O) = 95.21 + 72.08 = 167.29\ g/mol$$

(d) The % water in substance is:

$$\omega(H_2O) = \frac{m(H_2O)}{m(substance)} * 100\% = \frac{72.08}{167.29} * 100\% = 43.09\ \%$$