Answer on Question #64712, Chemistry / General Chemistry

I need to solve the following using the Molecular Formula:
1. Empirical formula = C2H4S; molecular formula = 179 amu
2. Empirical formula = C2H2O; molecular formula mass = 254 amu
3. Determine the molecular formula for a compound that is 41.3% C, 3.47% H, 55.14% O and has an experimental molar mass of 116.07g.
4. Determine the molecular formula for a compound that is 54.54% C, 9.15% H, and 36.32% O and has an experimental molar mass of 88g.
5. A 2.65g sample of a salmon-colored powder contains 0.70g of Cr, 0.65g S and 1.30g O. The molar mass is 392.2g. What is the molecular formula?

Answer

1 . $Mr(C_2H_4S)=60$

n=179/60=3

$C_6H_{12}S_3$ - molecular formula

2 . $Mr(C_2H_2O)=42$

n=254/42=6

$C_{12}H_{12}O_6$ - molecular formula

3 . $C_xH_yO_z$,

x : y : z = 41,3/12 :3,47/1 : 55,14/16

x : y : z = 1 : 1 : 1

CHO – empirical formula

Mr (CHO) = 29

n=116,07/29=4

$C_4H_4O_4$ - molecular formula

4 . $C_xH_yO_z$,

x : y : z= 54,54/12 :9,15/1 : 36,32/16

x : y :z = 2:4:1

C_2H_4O - empirical formula

$Mr(C_2H_4O)$ = 44,

n=88/44=2

$C_4H_8O_2$ - molecular formula

5 . $Cr_xS_yO_z$

W(Cr) = 26,42%, W(S)=24,53%, W(O)=49,05%

x : y : z= 26,42/52 : 24,53/32 : 49,05/16

x:y:z = 2:3:12

$Cr_2S_3O_{12}$ - empirical formula

Mr($Cr_2S_3O_{12}$)=392

n=392,2/392=1

$Cr_2S_3O_{12}$ - molecular formula