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Periodic table of elements on mars answer key

Thank you for your participation! Work is ongoing. Rhetue 15:38, April 12, 2011 (UTC) Before liquid water was found on Mars, astronomers pointed to the presence of ferric oxide responsible for the red color of Mars. Ferric oxide, also known as a rust, consists of iron metal left standing in water and oxidized. The Mars Phoenix Lander, which landed on the surface of Mars in 2008, carried instruments analyzing Mars' soil and found ice samples mixed with ferric oxide dust in the soil[1]. Phoenix used a sophisticated furnace and sniffing furnace that analyzed evaporated samples and identified the compounds it contained[2]. Data from released volatile compounds are sent back to Earth and analyzed. Figure \(\PageIndex{1}\) One of the simplest ways to distinguish chemicals from the artist's impression of landing in Phoenix is by molecular weights, which depend on individual atomic weights. An atom of each element has a mass ratio specific to other elements, and the mass of hydrogen is set to 1. So the atomic weight of nitrogen 14.0067 tells us that a nitrogen atom has about 14 times the mass of a hydrogen atom. Usually, these values are expressed in units of atomic mass units, or amu, though in proportions, they are technically unitless. The sum of the atomic weights of all atoms in the molecule and the molecular weights are calculated. The Atomic Weights Table lists atomic weights for all elements. Atomic weights remain constant throughout reactions regardless of your environment. Example \(\PageIndex{1}\): Molecular Weights Calculate the molecular weights of water (H2O) and ferric oxide (Fe2O3). Get the mass ratio of ferric oxide to water. Answer The molecular weight of each composition is obtained by the sum of the atomic weights of the constituent atoms. a) Molecular weight of H2O: \(\text{2}\times \text{(H)(O atomic weight)} = \text{(2 x 1)} + \text{16} = \text{18 amu}\) b) Molecular weight of Fe2O3: \(\text{2} \times \text{text{text (Fe)} + \text{3} \times \text{(Atomic weight O)} = \text{159.7 amu}\) c) The mass ratio of ferric oxide to water = \(\dfrac{\text{159.7 amu}}{\text{18 amu}} = \text{ 9 : 1 ratio}\) The mass ratio is roughly useful by determining how heavy a molecule is than the other. Example \(\PageIndex{2}\): The Mars soil sample weighing 25 g in Mass was collected by Phoenix and assumed to consist only of Fe2O3 and H2O. It was analyzed and found to be 24% elemental Fe, but the instruments failed to accurately measure the percentage of hydrogen and oxygen in the sample. Can fe2O3's % mass be obtained, and if so, what is its value? The answer is fe2o3's % mass can be obtained from the data given by comprehension that the Fe mass in the sample contributes only with Fe2O3 and that there should also be a stockiometric O amount for a certain amount of Fe. Because we can not find the amount in the example, we can't determine the body of water at the beginning. However, we can obtain a real mass of iron in the sample using the elemental % mass, and from this value, the amount of molar iron in the sample. Because Fe2O3 is a compound, we know that a certain oxygen molar ratio will always be with iron, and we use this ratio to obtain oxygen benes from Fe2O3. The total masses of the given iron and calculated oxygen take into account the total mass of Fe2O3. This value, divided by the mass of the entire sample, will give the % mass of Fe2O3. Let's review this description with calculations. 1) Find the actual mass of fe in the sample, for example, multiplying the mass by the given % Fe mass. \(\text{0.24} \times \text{25 g} =\text{ 6 g Fe in example}\) 2) Convert this value to mes using Molar mass. \(\text{6 g} \times \dfrac{\text{1 mol}}{\text{55.845 g}} = \text{0.1074 mol Fe}\) 3) We convert fe to moles to use the stockiometric ratio to O. \(\text{0.1074 mol Fe} \times \dfrac{\text{3 mol O}}{\text{2 mol Fe}} = \\text{3 mol O}}\text{2 mol Fe}} = \\text{3 mol O}\text{3 mol text{0.1612 mol O ferri fromc oxide}\) 4) O mol \(\text{0.1612 mol O} \times \dfrac{\text{16g}}}}}\\\\text{1 mol}} = \text{2.58 g O ferric oxide}\) 5) The mass of ferric oxide is obtained by dividing the combined masses of fe2O3 from Fe2O3 into the mass of the sample. \(\dfrac{\text{6 + 2.58 g}}{\text{25 g}} = \text{34/32 percent ferric oxide}\) Note that we cannot assume that all the oxygen found in the sample from ChemPRIME is these calculations: 2.5: Atomic Weights References Contributors and Ations In the elements study table compiled and reviewed by Course Planet, students are given clues and explanations of the elements to determine where they belong in the Mars Periodic Table. Based on the clues, place the elements in the appropriate place in the given periodic table. Save time and discover the engaging curriculum for your class. It is reviewed and rated by trusted, credential-provided teachers. Try It For Free

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