Bonding & Reactions Review - KEY

## **Part 1** | For each of the following boxes, fill in the symbol that fits the listed clue:

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| --- | --- | --- | --- | --- |
| Alkaline Earth Metal in the 3rd period | **Mg** |  | As an ion, it has 18 electrons and a charge of -2  | **S** |
| Has 3 valence electrons in the 3rd energy level | **Al** |  | The most reactive halogen gas | **F** |
| Has a mass of 119 when it has 69 neutrons | **Sn** |  | Phosphate | **PO4** |

## **Part 2** | For each of the combinations, write in the compound formula and name:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Al** | **+** | **S** | **=** | **Al2S3** |
| **Name** | Aluminum Sulfide |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Mg** | **+** | **PO4** | **=** | **Mg3(PO4)2** |
| **Name** | Magnesium Phosphate |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Sn** | **+** | **F** | **=** | **SnF4** |
| **Name** | Tin (IV) Fluoride |

## **Part 3** | For each of the example, identify the reaction type, predict the products, and balance the equation

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| **1** | Reaction Type: Double Replacement |
|  | **Al2S3** | **+** |  | **Mg3(PO4)2** | **🡪** | **2** | **AlPO4** | **+** | **3** | **MgS** |

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| **2** | Reaction Type: Single Replacement |
| **2** | **Mg** | **+** |  | **SnF4** | **🡪** |  | **Sn** | **+** | **2** | **MgF2** |

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| **3** | Reaction Type: Decomposition |
|  | **SnF4** | **🡪** |  | **Sn** | **+** | **2** | **F2** |  |

|  |
| --- |
| **4** | Reaction Type: Single Replacement |
|  | **Sn** | **+** |  | **Al2S3** | **🡪** |  No Reaction |

## **Part 4** | For each of the problem, use the balanced equations from part 3 and the periodic table to solve

How many moles Magnesium Fluoride are created when 5 moles of Tin (IV) Fluoride are reacted with excess Magnesium? (Reaction 2)

$$5 mol SnF\_{4}×\left(\frac{2 mol MgF\_{2}}{1 mol SnF\_{4}}\right)=10 mol MgF\_{2}$$

How many grams of Aluminum Sulfide are needed to produce 3.2 moles of Magnesium Sulfide? (Reaction 1)

$$3.2 mol MgS×\left(\frac{1 mol Al\_{2}S\_{3}}{3 mol MgS }\right)×\left(\frac{150.17 g Al\_{2}S\_{3}}{ 1 mol Al\_{2}S\_{3}}\right)=160.18 g Al\_{2}S\_{3}$$

How many moles of Tin (IV) Fluoride are needed to produce 30 liters of F2 gas? (Reaction 3)

$$30 L F\_{2}×\left(\frac{1 mol F\_{2}}{22.4 L F\_{2} }\right)×\left(\frac{1 mol SnF\_{4}}{ 2 mol F\_{2}}\right)=0.67 mol SnF\_{4}$$

How many grams of Aluminum Phosphate are created when 319.4 g of Aluminum Sulfide react? (Reaction 1)

$$319.4 g Al\_{2}S\_{3}×\left(\frac{1 mol Al\_{2}S\_{3}}{150.17 g Al\_{2}S\_{3} }\right)×\left(\frac{2 mol AlPO\_{4}}{1 mol Al\_{2}S\_{3} }\right)×\left(\frac{121.95 g AlPO\_{4}}{1 mol AlPO\_{4} }\right)=518.76 g AlPO\_{4}$$

How many atoms of Tin are produced when 30 moles of Tin (IV) Fluoride are reacted with excess Magnesium? (Reaction 2)

$$30 mol SnF\_{4}×\left(\frac{1 mol Sn}{1 mol SnF\_{4} }\right)×\left(\frac{6.02×10^{23} atoms of Sn}{1 mol Sn }\right)=1.8×10^{25} atoms$$