**DISPLACEMENT REACTIONS AND THE REACTIVITY SERIES**

**5.9 CLASS WORKSHEET**

**Note: most d-block metals form ions with a 2+ charge (eg Zn2+, Cu2+)**

**silver is an exception, it only forms Ag+ ions**

**Group 4 metals like Sn and Pb also usually form ions with a 2+ charge (eg Pb2+, Sn2+)**

**Carbon can form CO or CO2**

1. Arrange the following elements in order of reactivity, starting with the most reactive:

Cu, Zn, Mg, Fe, Al, H2, Pb, C, Ag

|  |  |
| --- | --- |
|  | Element |
| Most reactive  Least reactive | Mg |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |

1. **The following displacement reactions all take place.**

Complete and balance them, identify the atom or ion oxidized or reduced and deduce which of the elements is more reactive:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  | Equation | oxidized | reduced |
| (a) | Equation: | CuO + Zn 🡪 ZnO + Cu | Zn | Cu |
| Conclusion: | Cu is more reactive than Zn | | |
| (b) | Equation: | ZnCl2 + Mg 🡪 |  |  |
| Conclusion: |  | | |
| (c) | Equation: | Fe2O3 + 2Al 🡪 |  |  |
| Conclusion: |  | | |
| (d) | Equation: | Zn + 2HCl 🡪 |  |  |
| Conclusion: |  | | |
| (e) | Equation: | CuO + H2 🡪 |  |  |
| Conclusion: |  | | |
| (f) | Equation: | 2PbO + C 🡪 |  |  |
| Conclusion: |  | | |

**5.4A HOMEWORK**

1. **Some of the following reactions do take place, others don’t.**

Predict whether or not a reaction will take place; complete the reaction if it takes place; and explain your answer:

|  |  |  |
| --- | --- | --- |
|  | Equation | Reason |
| (a) | Mg + 2HCl 🡪 MgCl2 + H2 | Mg is more reactive than H |
| (b) | Cu + ZnO 🡪 no reaction | Cu is less reactive than Zn |
| (c) | FeCl2 + Zn 🡪 |  |
| (d) | Ag + HCl 🡪 |  |
| (e) | CuO + C 🡪 |  |
| (f) | MgO + H2 🡪 |  |

1. **Extraction of Metals**

Answer the following questions:

|  |  |  |
| --- | --- | --- |
|  | Question | Answer |
| (a) | Identify three metals which cannot be produced by heating their oxides with carbon: |  |
| (b) | Identify three metals which can be produced by heating their oxides with carbon: |  |

1. **Extra Credit Questions**

|  |  |  |
| --- | --- | --- |
|  | Question | Answer |
| (a) | Aluminium is above zinc in the reactivity series, but when granules of aluminium and zinc are added separately to hydrochloric acid, the zinc produces a steady stream of bubbles and gradually dissolves, but the aluminium does nothing visible. Why is this? |  |
| (b) | We have carried out the displacement reaction between zinc and copper sulfate on two separate occasions in the lab. We were investigating different aspects of the reaction each time. On each occasion, what were we investigating? |  |