

# Comparing metals' reactivities

## 1 Adding water / steam / dilute acids

- eg. Al & Cu (前提: 一个有 rx 一个没有)
- Add both metals into  $\text{HCl(aq)}$  respectively.
- For Al(s)
  - Al dissolves, colourless gas bubbles
  - Strength of reducing agent:  $\text{Al} > \text{H}^+$
- For Cu(s)
  - no observable change
  - Strength of reducing agent:  $\text{Cu} < \text{H}^+$
- Strength of reducing agent:  $\text{Al} > \text{H}^+ > \text{Cu}$ .  
Al is stronger reducing agent than Cu.

## 2 Displacement

- metal A(s) + metal B ion(aq)
- eg. Al & Cu
- Dissolve excess Cu into  $\text{H}_2\text{SO}_4(\text{aq})$  until no bubbling occurs.
- Filter the sol<sup>n</sup>, obtain filtrate as  $\text{CuSO}_4(\text{aq})$ .
- Add Al(s) into  $\text{CuSO}_4(\text{aq})$ .
- Sol<sup>n</sup> turns from blue to colourless  

$$\rightarrow 2\text{Al} + 3\text{Cu}^{2+} \rightarrow 2\text{Al}^{3+} + 3\text{Cu}$$
- Al is stronger reducing agent than Cu.

## 3 Simple chemical cell

- metal as electrodes
- eg. Al & Cu
- Connect Al & Cu as electrodes, dip into sol<sup>n</sup> containing electrolyte.
- Connect Al to -ve terminal of voltmeter through connecting wires, Cu to +ve terminal of voltmeter through connecting wires.
- A +ve voltmeter reading is expected.
- Al is a stronger reducing agent than Cu
- For more info. on simple chemical cells, see 7) Redox Reactions, chemical cells and electrolysis

