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 $HCl_{(aq)}$ respectively.
- For $Al_{(s)}$
  → Al dissolves, colourless gas bubbles
  → Strength of reducing agent: $Al > H^+$
- For $Cu_{(s)}$
  → no observable change
  → Strength of reducing agent: $Cu < H^+$
- Strength of reducing agent: $Al > H^+ > Cu$.
  Al is stronger reducing agent than Cu.

2 Displacement

- metal $A_{(s)}$ + metal B ion $_{(aq)}$
- eg. Al & Cu
- Dissolve excess Cu into $H_2SO_{4(l)}$ until no bubbling occurs.
- Filter the sol^n, obtain filtrate as $CuSO_{4\,(aq)}$.
- Add $Al_{(s)}$ into $CuSO_{4\,(aq)}$.
- Sol^n turns from blue to colourless → $2Al + 3Cu^{2+} \rightarrow 2Al^{3+} + 3Cu$

→ 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^n 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 *T1 Redox Reactions, chemical cells and electrolysis*