3.2.2 Group 2, the Alkaline Earth Metals

3.2.2 *Group 2 (Mg–Ba): trends, reactions with water, solubility of hydroxides and sulfates. Uses.*

Atomic radius increases down Group 2 (more shells). First IE decreases (outer electron further, more shielded).

Reactions with water: Mg reacts slowly with cold water, vigorously with steam. Ca–Ba increasingly vigorous: M + 2H■O → M(OH)■ + H■.

Hydroxide solubility increases down the group: Mg(OH)■ sparingly soluble → Ba(OH)■ soluble.

Sulfate solubility decreases: MgSO■ soluble → BaSO■ insoluble.

Uses: Mg(OH)■ antacids; Ca(OH)■ to raise soil pH; BaSO■ barium meals (X-ray contrast).

Mg extracts Ti from TiCl■ (Kroll process). CaO/CaCO■ removes SO■ from flue gases.

Sulfate test: add acidified BaCl■ → white ppt BaSO■. Acidify with HCl to remove CO■^{2}■/SO■^{2}■.