EngineeringRise

Group 13 and 14 trends and unique behaviour

Formulas and units, JEE Main. Status: Reviewed on 2026-11-20.

Result	Formula	Units or note
Valence electrons	group 13: ns2 np1; group 14: ns2 np2 Valid when: neutral ground-state main-group atoms, groups 13 to 18	number = group - 10
IE1 group 13 (kJ mol^-1)	B 801, Al 577, Ga 579, In 558, Tl 589	kJ mol^-1
Catenation (E-E, kJ mol^-1)	C 348 > Si 297 > Ge 260 > Sn 240	kJ mol^-1
Oxides of group 13	B2O3 acidic; Al2O3, Ga2O3 amphoteric; In2O3, Tl2O3 basic	n/a (qualitative)
Oxides of group 14	CO2, SiO2 acidic; SnO2, PbO2 amphoteric	n/a (qualitative)
Inert pair potentials	Tl3+ to Tl+: +1.25 V; PbO2 to Pb2+: +1.46 V Valid when: standard conditions (298 K, 1 M, acidic solution), aqueous couples	V
Gibbs energy of a redox step	dG = -nFE0, F = 96485 Valid when: standard state; n = electrons transferred; E0 in volts, F in C per mole	J mol^-1
Lewis acidity of boron halides	BF3 < BCl3 < BBr3	n/a (qualitative)
Maximum covalency	period 2: 4; period 3 and below: up to 6 Valid when: ligand count limited by available valence orbitals of the central atom	number of ligands

Full lesson with worked examples:
https://www.engineeringrise.in/learn/learn/jee-main/chemistry/p-block-elements/group-13-and-14-trends-and-unique-behaviour

EngineeringRise is an unofficial study site. It is not affiliated with NTA, the IITs, BITS, VIT, SRM or any exam body.