

the boron, carbon and nitrogen families: one p-block trend, run three times

Three Families, One p-Block Stretch

- group 13, boron family: B, Al, Ga, In, Tl; outer config ns^2np^1
- group 14, carbon family: C, Si, Ge, Sn, Pb; outer config ns^2np^2
- group 15, nitrogen family: N, P, As, Sb, Bi; outer config ns^2np^3
- none occurs free as a monatomic gas: compounds, polyatomic molecules, or covalent networks

group 14 banded



the p block's right-hand columns: the three families are three neighbouring columns, and the banded one here is group 14, the carbon family

configs differ from the nearest noble gas by 3 or 4 electrons, e.g. N_2 , P_4 , C_{60} , graphite, diamond

Condensed Electronic Configuration *

Group 13	config	Group 14	config	Group 15	config
5B	$[He]2s^22p^1$	6C	$[He]2s^22p^2$	7N	$[He]2s^22p^3$
13Al	$[Ne]3s^23p^1$	14Si	$[Ne]3s^23p^2$	15P	$[Ne]3s^23p^3$
31Ga	$[Ar]3d^{10}4s^24p^1$	32Ge	$[Ar]3d^{10}4s^24p^2$	33As	$[Ar]3d^{10}4s^24p^3$
49In	$[Kr]4d^{10}5s^25p^1$	50Sn	$[Kr]4d^{10}5s^25p^2$	51Sb	$[Kr]4d^{10}5s^25p^3$
81Tl	$[Xe]4f^{14}5d^{10}6s^26p^1$	82Pb	$[Xe]4f^{14}5d^{10}6s^26p^2$	83Bi	$[Xe]4f^{14}5d^{10}6s^26p^3$