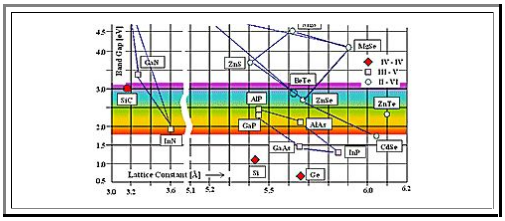
2.3.3 Summary to: 2.3. III-V Semiconductors

- III-V semiconducrors combine the group III elements Al, Ga, In) with the group V elements N, P , As, Sb; giving **12** possible combinations.
  - The most important ones are probably **GaAs**, **InP GaP** and **GaN**
  - Band gap energies and types vary; lattices are zincblende / sphalerite (= **fcc**) or wurtzite (= **hex**).

Properties	Si	GaAs	InP	GaP	GaN	$In_{0,53}Ga_{0,47}As$
Band gap [eV]	1,12	1,42	1,35	2,26	3.39	0,75
Type	Indirect	Direct	Direct	Indirect	Direct	Direct
Lattice	fcc	fcc	fcc	fcc	hex	fcc

- Ternary and quaternary ($III_xIII_{1-x}V_yV_{1-y}$) compounds are relatively easy to make.
  - Properties like band gap, lattice constant, refractive index then adjustable to some extent.
  - Main materials for optoelectronic products. Some high-speed and sensor applications.
  - "Master diagram" = bandgap vs. lattice constant is of elementary importance for semiconductor technology.



Exercise 2.3-1

All Class Exercises to 2.3