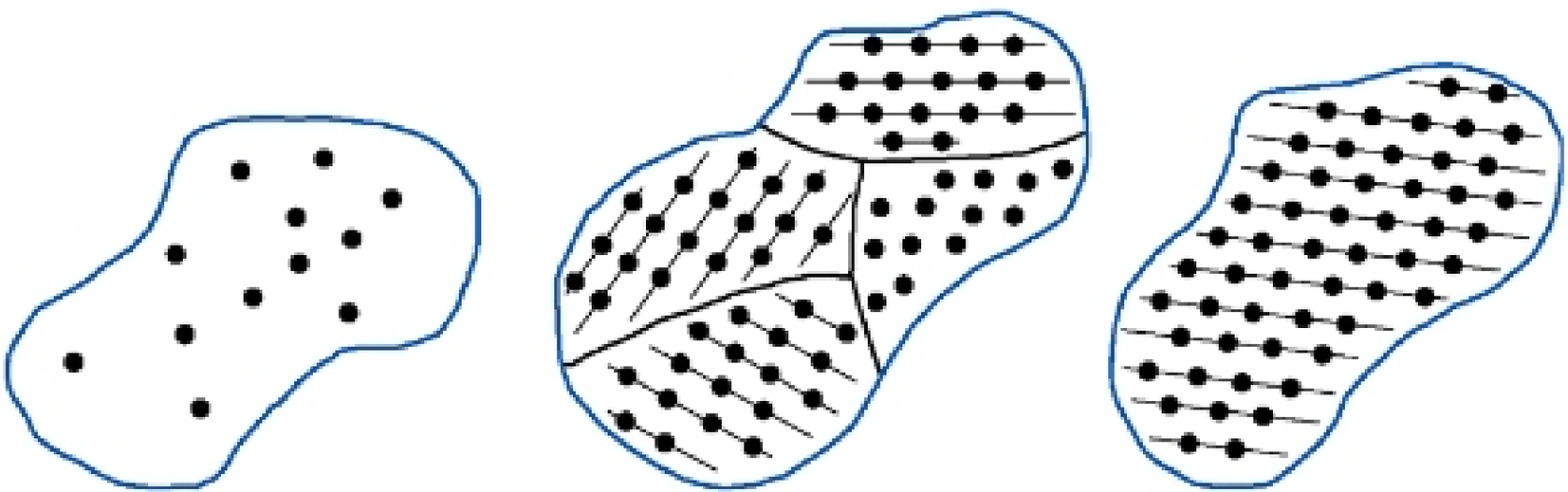
- Amorphous

Polycrystalline

Single crystal



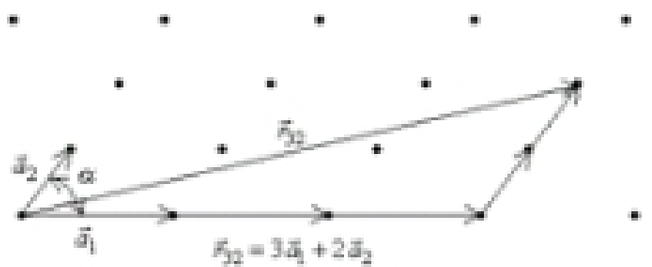
(a) (b) (c)

- What is a lattice ?

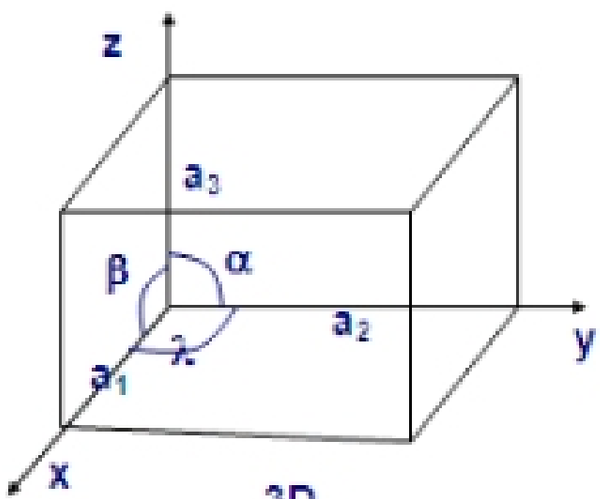
  - A lattice is a 1, 2 or 3 dimensional mathematical abstraction. Any lattice point r in the 3D space can be generated by a linear superposition of three fundamental translation vectors a_1, a_2, a_3

$$\vec{r} = k\vec{a}_1 + l\vec{a}_2 + m\vec{a}_3$$

where k , l and m are a set of integers



2D

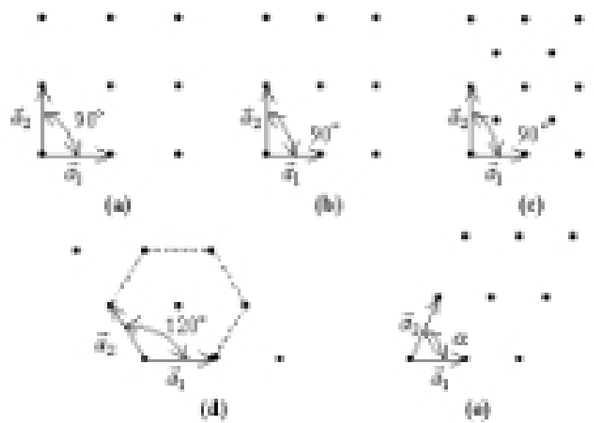


3D

Symmetry considerations limit the number of distinct lattice types called Bravais lattices that make up the whole crystal space

How many distinct Bravais lattice types can exist in 1D ?

How many distinct Bravais lattice types can exist in 2D ?



Square, Rectangle, Centered Rectangle, Hexagon, Oblique Rectangle. Graphene is an example of a 2D crystal with hexagonal lattice