

Ionic Conductors (Superconductors)

They are solid state ion conductors used primarily in solid oxide fuel cells. They conduct electricity due to the movement of the ions through the voids.

An example would be yttria-stabilized zirconia (YSZ)

Ionic Solids

Physical behaviour

-HARD(-NESS) related with the attractive cohesion force in the ionic structure. This property is related with the absolute value of the lattice energy (directly to the charge of ions, inversely to their size)

-RIGID strong attractive forces hold ions in specific positions

-BRITTLE when enough force is applied, ions of similar charge are brought next to each other, and repulsions between them crack the sample

ELECTRIC CONDUCTIVITY

-solid state insulators (the valence electrons aren't mobile and the ions are in fixed positions))

-when molten electricity conductor (ions are mobile)

Ionic Solids (cont)

-when dissolved in polar solvents electricity conductor (ions are mobile)

SOLUBILITY

$\Delta H_{\text{solution}} = -U + \Delta H_{\text{solvation}}$ the higher the lattice energy of a salt, the less soluble it is

MELTING AND BOILING POINTS

-high melting point freeing ions from their positions require large amount of energy

-much higher boiling points (the higher U is, the higher its boiling/melting point is)