



Geopolymers: Wonder Material for Next Decade

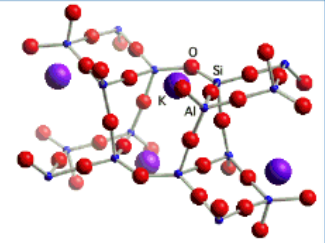
Materials for Radiation Shielding and Cement free Concrete

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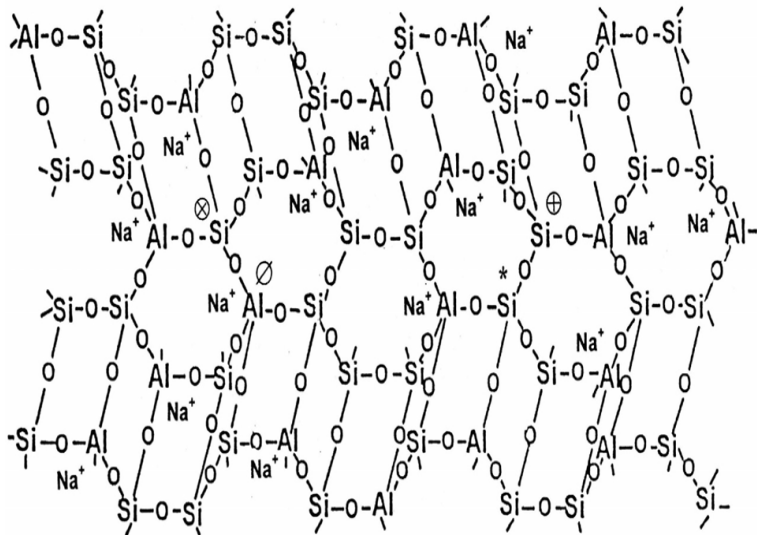


Geopolymers

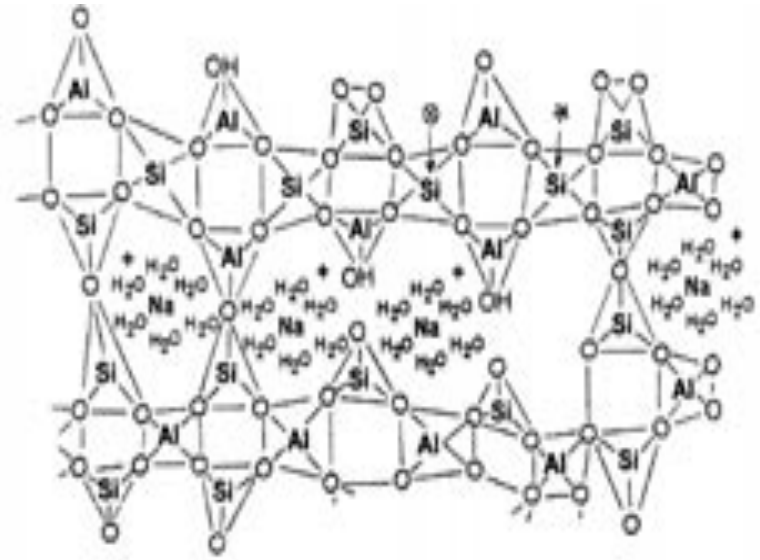


An environmental alternative to CO₂-producing Portland Cement

Amorphous (gel like), partially amorphous or crystalline
Network configured of SiO₄ and AlO₄ tetrahedrons united together by oxygen bridges.



Davidovits model of geopolymer structure

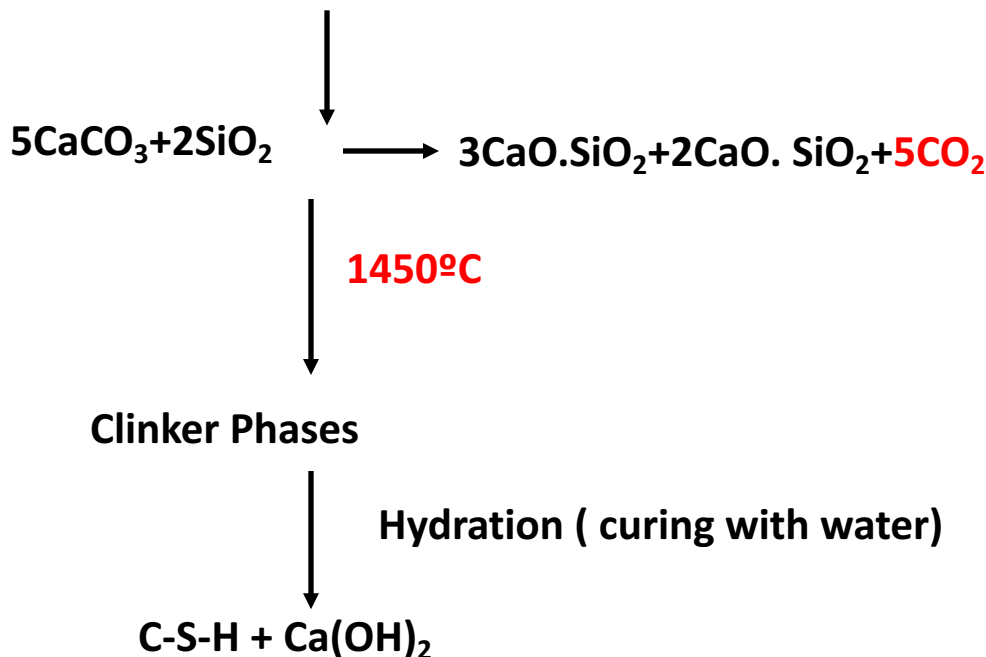


Barbosa model of geopolymer structure

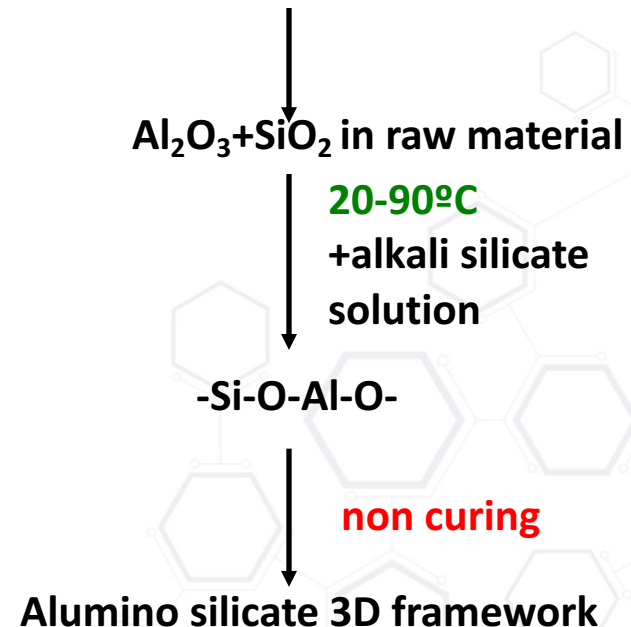
Characteristics of Geopolymers Compared with Conventional Concrete

Energy Saving , Environmental Protection and Production Cost : Synthesis of geopolymers occurs at very low temperature. Resulting in 3/5th less energy consumption than Cement. 80% less CO₂ emission. Due to this reason they are called GREEN MATERIALS. Low production cost as they are based on alumino-silicate raw materials naturally occurring on earth crust or derived from industrial waste

Conventional cement



Geopolymeric cement





Why Advanced Cement Free Matrix ?

Properties

Conventional Cement Concrete

Fly Ash based Geopolymer Concrete

Curing	Water Curing	No Water Curing (Ambient Thermal Curing)
Fire Resistance*	Looses Strength (about 550 ° C)	Fire Resistant (Retains Strength up to about 900 ° C)
Chemical Resistance	Susceptible to Sulphate / Acid	Resistant to Sulphate / Acid
Shrinkage	Inherent Shrinkage	Low Shrinkage (About ¼ th of Conventional Cement Concrete)
Thermal Expansion	Inherent Thermal Expansion	Low Thermal Expansion (About 1/3 rd of Conventional Cement Concrete)
Creep	Inherent	Low Creep (About ¼ th of Conventional Cement Concrete)
Ice Melting	Very Slow	Very Fast
Durability	Very Good	Excellent

* Fire Resistant can not be achieved by conventional Cement Concrete