

Answer on Question#75572 – Chemistry – General chemistry

Question:

5) Explain what is meant by pozzolan and explain why it is used in cement product (include equations). Do this for gypsum as well.

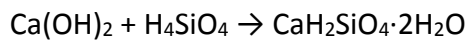
6) Relate the characteristics of three speciality cements (not Ordinary Portland)

to their uses

Answer:

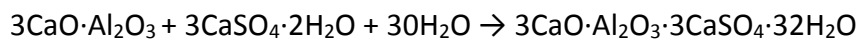
5) Pozzolan is silicate-based material that reacts with the calcium hydroxide generated by hydrating cement to form additional cementitious materials. The result of pozzolan addition is higher compressive strength, performance and greater durability.

The chemical reaction that occurs in Portland cement:



Gypsum is the mineral that used as addition to cement (2-3%). The chemical formula of gypsum is $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$. The most important role of gypsum is keeping the cement in plastic state at early age of hydration.

The chemical reaction between cement and water that occurs in presence of gypsum:



6)

Type I	General purpose	Fairly high C_3S content for good early strength development	General construction (most buildings, bridges, pavements, precast units, etc)
Type II	Moderate sulfate resistance	Low C_3A content (<8%)	Structures exposed to soil or water containing sulfate ions
Type III	High early strength	Ground more finely, may have slightly more C_3S	Rapid construction, cold weather concreting

Source:

1. N. Bhanumathidas, N. Kalidas. Dual role of gypsum: Set retarder and strength accelerator // Indian. Concrete Journal, 2014.
2. <http://iti.northwestern.edu/publications/utc/tea-21/FR-5-Jennings-Thomas.pdf>