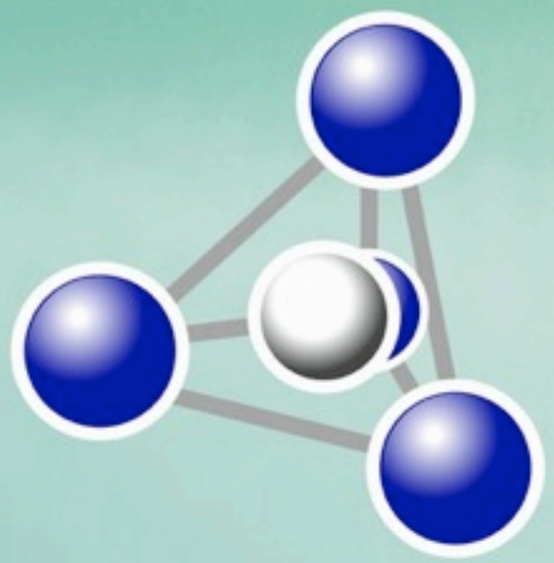

INSTITUT GÉOPOLYMÈRE

Prof. Dr. Joseph Davidovits

www.geopolymer.org

2012

GEOPOLYMER CAMP

Geopolymer in Wikipedia

Geopolymers *From Wikipedia, the free encyclopedia*

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Geopolymer is a term covering a class of synthetic aluminosilicate materials with potential use in a number of areas, essentially as a replacement for Portland cement and for advanced high-tech composites, ceramic applications or as a form of cast stone.

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The name Geopolymer was first applied to these materials by Joseph Davidovits[1] in the 1970s, although similar materials had been developed in the former Soviet Union since the 1950s, originally under the name "soil cements".[2][3] However, this name never found widespread usage in the English language, as it is more often applied to the description of soils which are consolidated with a small amount of Portland cement to enhance strength and stability.

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Geopolymers are an example of the broader class of alkali-activated binders, which also includes alkali-activated metallurgical slags and other related materials.[4]

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Research

Research

Much of the drive behind research carried out in academic institutions involves the development of geopolymers as a potential large-scale replacement for concrete produced from Portland cement. This is due to geopolymers' alleged lower carbon dioxide production emissions, greater chemical and thermal resistance and better mechanical properties at both ambient and extreme conditions.

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There is some debate[*by whom?*] as to whether geopolymer cement has lower CO_2 emissions compared to Portland cement. Calcination of limestone in production of Portland cement is responsible for CO_2 emissions (one ton of cement produced releases one ton of CO_2), while some processes of formation of lime also release CO_2. Mainly it is the ratio of CO_2 reduction that is under debate, and it is process-dependent.

Geopolymers *From Wikipedia, the free encyclopedia*

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Industrial and high-tech applications rely on more expensive and sophisticated siliceous raw materials.

Geopolymers *From Wikipedia, the free encyclopedia*

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Theory

Geopolymers *From Wikipedia, the free encyclopedia*

Theory

The majority of the Earth's crust is made up of Si-Al compounds. Davidovits proposed in 1978 that a single aluminium and silicon-containing compound, most likely geological in origin, could react in a polymerization process with an alkaline solution. The binders created were termed "geopolymers"

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Some have ***alleged*** that ancient "Roman cement" is a geopolymer, but in reality this material is chemically unlike alkali activated geopolymers because it is made using lime and forms calcium-silicate-hydrates, making it much closer to Portland cement from a chemical standpoint.

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3. Setting via polycondensation reactions into an inorganic "polymer" (actually a crystalline-like lattice).

The inorganic polymer network is in general a highly-coordinated 3-dimensional aluminosilicate gel, with the negative charges on tetrahedral Al(III) sites charge-balanced by alkali metal cations.

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However, because Roman cement forms calcium-silicate-hydrates, and requires calcined limestone as a reactant/precursor, it is more similar to Portland cement than alkali-activated "geopolymer cements" such as Pyrament cement of LoneStar.[6][7]

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Geopolymer Ceramic chemists

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reacts in both systems.