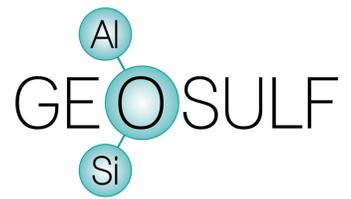


# Geopolymerization of hazardous materials

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## GEOPO-project, 2012-2015

### Stabilization of hazardous ashes into geopolymeric structures

The target of GEOPO-project is to develop methods for the immobilization of hazardous ash and slag fractions by using synthetic aluminosilicates as a binding material.

#### Needs:

Bio-based ashes contain also hazardous components which restrict their utilization.

Legislation guidance: The end disposal costs of solid wastes are increasing meanwhile the waste legislation has made it possible to get rid of the waste status through end-of-waste procedures.

Environmental aspects that need for sustainable growth.

#### Approach:

Novel encapsulation methods for hazardous ashes utilizing geopolymers as a binding material.

Methodology and analytical tools will be studied in international co-operation with world class research groups.

#### Benefits:

Hazardous wastes utilized in novel products.

Novel products having high strength, dimension stability, fire resistance, acid resistance and thermal conductivity.

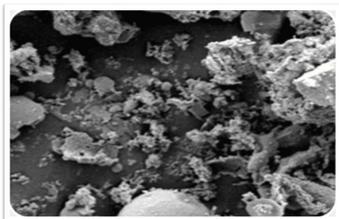
Use of geopolymer as a binder in the place of cements offers comparable properties with significantly lower greenhouse emissions and energy consumption.

Local business.

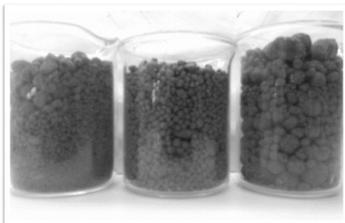
#### Competition:

Alternative methods for heavy metal stabilization.

Products from ordinary cement.



Raw materials: solid aluminum silicate material (biomass fly ash) + alkali activator



Production of alkali-activated biomass fly ash granules by high shear granulator



Utilization of granules in concrete and earth construction applications

## GEOSULF-project, 2014-2017

### Utilization of sulphide mine tailings in geopolymer materials

The GEOSULF project aims to sustainable utilization of sulphide mine tailings in geopolymer materials. Geopolymerization recipes, geopolymer aggregates and concrete products will be developed by utilizing sulphide mine tailings provided by Finnish and Polish gold and copper mines.

#### Needs:

Disposal of mine tailings is one of the most important environmental issues during the mine lifetime, especially for processing of sulphide minerals. Safety methods to store and the sustainable utilisation of mine tailings are needed.

#### Approach:

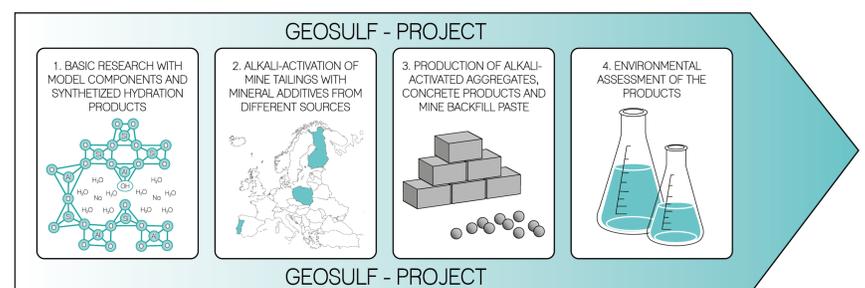
The GEOSULF-project aims at deep understanding on geopolymerisation of mine tailings into form in which harmful substances cannot dissolve. In geopolymerisation, aluminium and silicate rich materials are activated with alkali solution. The formed geopolymer is a three-dimensional amorphous network that can immobilize hazardous components into its structure.

#### Benefits:

Scientific and practical knowledge on geopolymerisation of sulphide mine tailings. The proof of concept for safety storage for mine tailings and producing marketable value-added products from mine waste.

#### Competition:

Possible arrival of a competitive method to the market for the treatment of mine tailings.



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