

Event:
Date:
Place:

ENERGY in BUILDINGS 2016
Saturday November 12, 2016
Athens, Hellas



#	<p>Dimitrios Kioupis Chemical Engineer NTUA, B.Sc., M.Sc., PhD</p>	
Title:	Research Associate at National Technical University of Athens, Greece	
Presentation title:	Thermal Insulating Geopolymers Based on Inorganic Foaming	
<p>Alkali activated foams (geopolymer foams) constitute promising materials for thermal insulation, fire protection and sound proofing applications. In this study, geopolymer foams were synthesized by using coal fly ash as the aluminosilicate source and metallic powders (Aluminum, Silicon and Zinc) as the foaming agents. A comparison between the foaming agents demonstrated that Al is the most drastic element. The application of the Taguchi multifactorial designing model revealed the effect of the synthetic factors (foaming agent concentration, alkalinity and alkali selection) upon the Al foams properties (compressive strength and apparent density). The most influential factor was the foaming agent content while the alkalinity (R/Al) followed in significance. The alkali selection (Na/Na+K) had limited effect. The optimal synthesis conditions for achieving the highest strength (20.5 MPa) are: Al% w/w = 0.010, R/Al = 1.2 and Na/(Na + K) = 0.65 while those for the lowest density (0.65 g/cm³) are: Al% w/w = 0.100, R/Al = 0.8 and Na/(Na + K) = 0.65. The physicochemical characterization included techniques such as XRD, FTIR, SEM and optical microscopy. Optical microscopy showed that the pore size is majorly affected by the foaming agent content while the pore shape by the alkalinity. Lightweight geopolymers in a wide range of compressive strength (S) and apparent density (d) values were prepared (S = 1.64-22.05 MPa and d = 0.59-1.56 g/cm³). Thermal conductivity measurements showed that the alkali activated foams can be used as insulating materials. The samples containing 0.035 and 0.100% w/w Al exhibited thermal conductivity values of 0.17 and 0.09 W/mK.</p>		
CV:	<p>Dimitrios Th. Kioupis studied Chemical Engineering at National Technical University of Athens (NTUA) while he received his MSc degree upon Solid State Physics from the Physics' department of NTUA. His PhD research dealt with the synthesis optimization, structure determination as well as the electrical properties of Apatite type Lanthanum Silicates applied in the field of Solid State Electrolytes. From 2014, he is a Research Associate at the school of Chemical Engineering of NTUA and has been involved in several European and National scientific projects. Till now, he has published over 20 papers in international journals and conferences. His scientific interests are related to the synthesis (Pechini, auto-combustion, mechanochemical activation), structure and properties (thermal, electrical) of electro-ceramics, the chemistry and technology of alkali activated aluminosilicate binders (geopolymers) and the recycling of waste materials from different waste streams (industrial, construction and demolition, agricultural, etc.) in the building sector.</p>	