



2ο Παναρσακειακό Μαθητικό Συνέδριο

ΕΠΙΣΤΗΜΗ & ΠΟΙΟΤΗΤΑ ΖΩΗΣ «Μέτρον ἄνθρωπος;» ΠΕΡΙΒΑΛΛΟΝ - ΥΓΕΙΑ

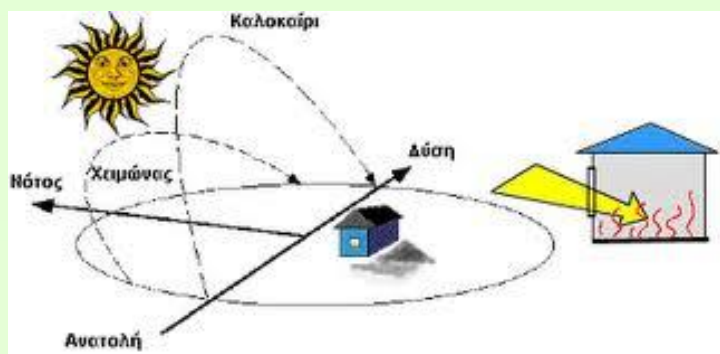


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Bioclimatic Architecture and Nanotechnology

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Bioclimatic Design is an energy design, that is, the design of buildings based on the sound use of energy. The main aim is to ensure the existence of suitable conditions that will provide the building with the right thermal behavior during all seasons. Through bioclimatic design, we mostly achieve: a) financial benefits (decrease in the cost of electromechanical installation), b) environmental benefits through the decrease of carbon dioxide emissions and c) quality of life improvement



Building positioning according to east to west axis



Functional organization of the interior

Eastern side:

Areas used for a long time and in need for high temperature (living-room, dining-room, office)

Southern side:

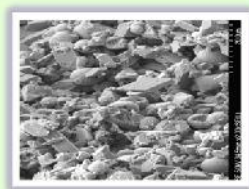
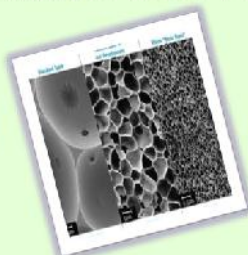
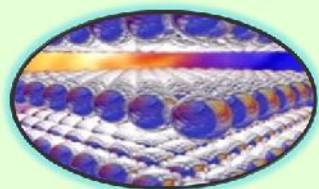
Bathrooms

Middle thermal zone:

Bedrooms

Northern side:

Depot, garage



How Nanomaterials serve bioclimatic design:

- Photoexcitation nanomaterials (they become more compact or change color when hit by the sun; also, intelligent materials which seal building openings).
- Phase change materials (they can store - in a small surface - adequate quantities of heat).
- Organic nanofoams (porous materials in a nanometer scale).
- Aerogels (a kind of organic nanofoams, extremely porous and with low density, which are produced mostly in two ways: a) The first one involves the creation of aerogel with the incorporation of polymers. In this way the aerogel surface changes because of its reaction to the polymer. As a result the interior surface of the aerogel is covered with a thin layer of polymer, making the material more resistant. A different aerogel is created depending on the polymer used. This kind of aerogel has the same kind of properties as silica-aerogel but it is less fragile. b) The second way involves the creation of aerogel exclusively by polymers. This aerogel is flexible and highly durable. Aerogels are highly porous and of low density. This semitransparent material is regarded as one of the best heat insulating materials. Nowadays the main market for this nanotechnology product is in fields such as the insulation of underwater natural gas and oil pipelines or in the space industry. Its usage in buildings as a heat insulation material is possible in the future, though.

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