

NIMS GREEN SEMINAR

“NOVEL LIQUID-CHEMISTRY DERIVED MATERIALS SOLUTIONS FOR ENERGY EFFICIENT BUILDING ENVELOPES”

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Abstract

The energy savings potential of buildings is not only rather sizeable, but perhaps more importantly represents one of the only short-term measures to reduce the global energy consumption and thus CO₂ emissions. Our research group specializes in developing materials solutions for the buildings of tomorrow.

Modern building envelopes with double or triple glazing and standard insulation allow the construction of low-energy or even zero-energy buildings. Given the increasing amount of glazed surfaces in modern architecture and globally rising temperature levels, overheating due to high solar gains is a major concern. The development of smart, thin-film based solar control strategies represents a unique solution that does not require additional mechanical installations such as blinds or shades. In a first part of the presentation, the use of sol-gel and colloidal chemistry methods in glazing applications will be portrayed and underlined by a few selected examples from our laboratory.

The second part then deals with thermal insulation materials: for the retrofit of typical but more importantly historical buildings, today's standard insulation products do not provide the desired performance or their use is limited due to other constraints. This is why high performance insulation materials such as vacuum insulation panels and less damage sensitive aerogel materials are currently experiencing an impressive comeback. The audience will be presented a current state-of-the-art of aerogel-based superinsulation materials in Europe, their disadvantages and ongoing efforts in our laboratory to overcome those limitations.