


Event:
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ENERGY in BUILDINGS 2017
Saturday October 21, 2017
Athens, Hellas



WORKSHOP
Research and Innovation activities in nanotechnology
concerning Energy Efficient Buildings

 http://isobioproject.com/	<p>Nadia Sid</p>	
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<p>Project title:</p>	<p>ISOBIO</p>	
<p>Presentation title:</p>	<p align="center">Development and Demonstration of Highly Insulating, Construction Materials from Bio-derived Aggregates</p>	
<p>The ISOBIO project will develop a new approach to insulating materials through the novel combination of existing bio-derived aggregates with low embodied carbon and with innovative binders to produce durable composite construction materials. These novel composites will target 50% lower embodied energy and CO2 at component level and 20% better insulation properties than conventional material. The project will also seek to demonstrate a reduction of at least 15% in total costs and 5% total energy spent over the lifetime of a building.</p> <p>ISOBIO started by identifying promising organic materials that could be used as insulation. Many of these are classified as waste or by-products of processes like food production. Finely chopped bio-materials such as hemp and straw are treated with hygrothermal resins and nano-particles that make them robust, breathable, moisture resistant, and fire retardant.</p> <p>The bio-aggregates are typically the result of combining organic and inorganic materials; the organic material may have natural insulating properties, for example, while the inorganic material may make the resulting bio-aggregate more robust. Combining organic materials with inorganic materials is not always easy, however. Hemp, for instance, is being combined with lime mortar but the two materials have a degree of chemical incompatibility which could result in a reduction in the strength of the composite material.</p> <p>To overcome this challenge, ISOBIO's researchers are using nano-technology to increase the interfacial strength between the two materials, giving the resulting composite material improved mechanical and structural properties.</p> <p>The new materials not only improve upon the performance of conventional materials, they also offer new features. Hemp shiv, which is the core of the hemp stalk, for example, has a porous structure that provides moisture buffering to maintain humidity at a more constant level.</p> <p>While the new composite materials may provide more comfort, they need to be at least as robust as conventional materials. To make the hemp-based bio-aggregate water repellent,</p>		

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for example, ISOBIO's researchers are applying hydrophobic treatments to it. The result is that water vapour can travel in and out of the material but liquid water cannot penetrate it.

ISOBIO is also making sure that its products can be compared with conventional ones by quantifying the energy efficiency of conventional materials. As part of its life cycle analysis, the project is analysing over 100 existing materials. Despite these efforts, perception and lack of awareness remain major obstacles to adoption.

Despite these challenges, the market for ISOBIO's composite materials is promising. On the supply side, sourcing local organic materials helps reduce transportation costs, while using waste or by-products as inputs helps control the cost of the final product. On the demand side, demographic trends are leading to a shortage of housing, and especially affordable housing. Increasing the availability of new and affordable housing will require novel construction methods and designs that allow more rapid construction.

CV:

Nadia Sid is a Senior Project Leader in the Functional coating and resin at TWI Ltd. She joined TWI in 2013 after receiving her M.Eng. in Chemistry with specialisation in organic chemistry, University of Strasbourg (France) and a Master degree in Business and Management, EM Strasbourg Business School. She has worked in BASF (Germany) on protective coating formulation for building application prior to join TWI.