

Sponge: A new technology for performative surfaces

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ABSTRACT: The future of architecture relies on not designing buildings, but designing intelligent and integrated systems that simulate the multi-purpose mechanics in nature. Architects and developers have to find materials and technics to implement biological logic to achieve sustainable, durable and multi-functional building components and systems. The design of advanced materials, with the goal of obtaining responsive environments, plays an imperative role in creating buildings of the future. With this notion in mind, this presentation explains our firm's study on a super-hydrophobic and super-porous carbon sponge material (the Sponge), developed at the labs of University of California, Riverside to find out the material's architectural applications allowing performative and sustainable systems. The Sponge technology separates oil-based contaminants from water, with an absorption capacity of 10 to 50 times of its weight, depending on its microstructure. It is highly sustainable with the capability of being used more than 20 times for filtration and contaminant absorption without any significant change in its efficiency. The technology is designed to be cost-effective, with its main precursor being sugar. We are currently analyzing the interaction of Sponge with various construction materials to potentially eliminate conductors, insulators and additional waterproofing layers from building surfaces. We are also studying its post-construction and maintenance applications, as the late studies of the material show ferromagnetic effects, which allow different disposal and recycling methods. The preliminary results show that the technology can build removable and reusable layers that function both as insulation and waterproofing. We are continuing an in-depth study on its conductive and ferromagnetic implications with the aim of expanding the functionality of the designed surface. The potential future applications of the material and its applications on building technologies will also be presented.