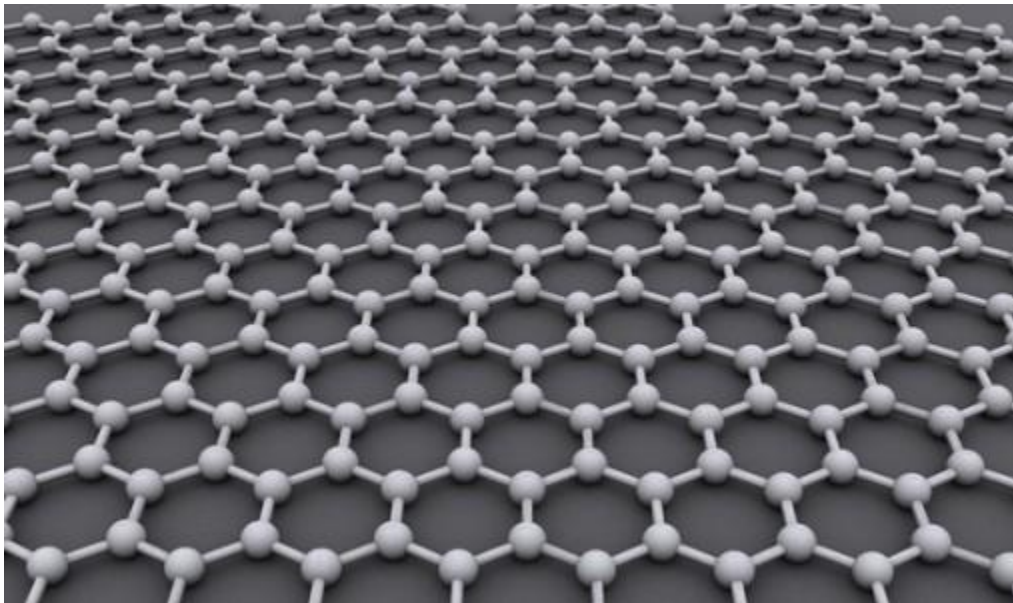


Uses of Nanotechnology for Architectural Design-The Graphene Skin

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Significant **uses of nanotechnology** are surfacing, and it is making waves in various fields as it promises newfound opportunities — and our field of architectural design and the construction of built environments is no exception. Already there are key developments underway which highlight some of the solutions and applications which nanotechnology will work toward, as it impacts people, their surroundings and the objects within those surroundings which they use.



Uses of Nanotechnology - Model of Graphene Structure
Image: CORE-Materials / Flickr

Of course, nanotechnology uses are aiming to be diverse and multifaceted in that new materials are emerging with different property characteristics than we are used to working with, or better yet experiencing. As we delve deeper into the **uses of nanotechnology**, we should begin to ask ourselves what can we do with this technology, at this nano scale, that we could not do before to solve many of the critical problems that we as a people face today.

So, to begin with that exploration, I will further explain to you through this article some key **uses of nanotechnology** that will affect the design and use of our architectural built environments and those people who inhabit them.

Graphene: Redefining the Way We Think and Use Surface

A material that acts like a piece of paper in many ways, but one that brings with it so many new and exciting possibilities — this is what we call graphene. Graphene, as the Nobel winner Andre Geim explains in an article by Tim Carmody in *Wired*, “*is stronger and stiffer than diamond, yet can be stretched by a quarter of its length, like rubber. Its surface area is the largest known for its weight.*” (1) Needless to say, graphene holds tremendous promise for the future on so many levels.

Here are some of the qualities that make graphene such an important nanomaterial:

“To make graphene paper, raw graphite is milled and purified using a chemical bath, which reshapes its structure, allowing it to be pressed into thin sheets. These graphene sheets boast excellent thermal, electrical and mechanical properties – including excellent hardness and flexibility.” (2) — Inhabitat

But how might graphene help architectural design?

Graphene will no doubt have a multitude of impacts upon the built environment — and significant among those will be on the evolution of “surface”. To give you some straightforward visions of future graphene applications, take a look at the following video where you will immediately see the jump between some of the most popular surfaces we use today, and those surfaces with which we will be able to manipulate and engage in the not-too-distant future.

Keep in mind that the video below focuses on graphene possibilities in terms of digital interface displays, but notice what the displays are capable of doing that they could not do before, and what a difference it would make if similar limitations were lifted from architectural design.

I show you the last video to get you thinking about how powerful changing the properties of our surface materials can be. As you can see, one of the **uses of nanotechnology** will no doubt allow for thinner surfaces, electrical conduction, great strength and superb flexibility, where that flexibility is at times even foldable.

Just imagine a fluid “fabric-based” adaptable architecture where its “nervous system” is embedded in its skin — which would be both lightweight and foldable. Additionally, occupants could engage with its interface just about anywhere (handy if it flexes, molds and bends), and it could provide great protection as its strength makes it more durable and agile. Of course, this vision is in the future, but it is important to guide such nanomaterials into design directions which could do the most good.

Within architecture, the notion of surface will continue to evolve into the notion of “skin”. In this light, you as an architect should not hesitate to think in multisensory dimensions in order to allow for the sophistication and beauty which such and nanotechnologically-based skin could exude.

<http://sensingarchitecture.com/6779/uses-of-nanotechnology-for-architectural-design-the-graphene-skin/#more-6779>

Building design skins, both interior and exterior, will be in less need of repair, will likely be antibacterial, and will likely allow for a more personalized experience for the occupant observing or using it. Such a skin could be used for responsive design solutions where architectural skins could “wear more hats” — performing a wider variety of functions within a smaller amount of space and time.

Needless to say, I can see graphene embedded in a variety of places within occupant environments, and it is up to you as the architect to realize the potential of what such a material can do not only to help our planet but also to help those occupants which you serve live better lives. I know I will be on the lookout for future graphene developments.