

# Glass gets smart

It's now safe to say that people who live in glass houses will be able to throw stones, now that intelligent glass material has been developed in the industry for use across businesses and homes. Provided that is, that the glass in their building consists of high-tech 'smart glass.'\*

**S**mart glass is durable, versatile and easy to clean and maintain. However, the prominent quality of smart glass is that it has the ability to quickly adjust the amount of light entering through windows, and provide the exact privacy level or opaqueness desired.

Scientists from around the globe have been working on smart glass technology for years. Many countries lay claim to the invention, but according to Britannia Glass it's fair to say that the researchers from Lawrence Berkeley National Laboratory (LBNL) and the Autonomous University of Barcelona are responsible for combining old research with innovative technology to create a smart glass that is both technologically sound and economically feasible.

Tinted glass can help with glare and heat loss but does not switch, adjust and respond to changing conditions like smart glass technology. This glass is able to adjust to different wavelengths of light, and will change our perception of glass and its implementation in office buildings, automobiles, aircraft and energy-saving homes.

## The science

Delia Milliron is a materials chemist at LBNL and the lead author of the recent research study that created this smart glass product. She and her associates produced nanocrystals that were filled with free electrons. These nanocrystals helped in the absorption of variable wavelengths of light.

Next, the group focused on absorbing infrared light by using indium oxide altered with a small amount of tin. When an electrical current was sent through the nanocrystals, the tin changed the amount of electrons that were blocking the infrared radiation. The results were that heat coming in through the glass could be easily controlled and adjusted, without changing the transparent quality of the window glass.

Once Milliron's team took the heat-blocking nanocrystals and placed them into niobium oxide glass, the results were astounding. Now the glass had the ability to reach a level of darkness that had not been expected but was key to transforming how window glass will be manufactured in the future.

## The benefits

The following list contains a few of the ways smart glass will transform the use of transparent, changeable glass in everything from home usage to corporate buildings to industrial implementation:

- Saves energy and money by adjusting the amount of heat and light originating from window glass;
- Provides privacy without the need for expensive window treatments such as dust-collecting draperies and blinds;
- Eliminates fading and discoloration of floors, carpeting, furnishings or other interior valuables that may be damaged by the sun's rays;
- Adds important safety features for use in aviation, automobile and train windows;
- Reduces the need for interior lighting when adjustable natural light can be used instead;
- Protects skin from harmful UV rays;
- Conserves energy by low working voltage.

Right now, two concerns with the product might be how to implement manufacturing standards, and how to control costs.

Smart glass is an energy reducing, high performance material which offers multiple uses. It can change in response to an individual's preferences and can be made without costly or difficult to accomplish manufacturing methods. ■

\*Britannia Glass, UK  
Website: [www.britanniaglass.co.uk](http://www.britanniaglass.co.uk)

