



Smart and Cool Window Coating

DISCOVERY

About 30% of the energy used in the United States each year goes toward lighting and cooling space inside buildings.



To help reduce this use, researchers from Lawrence Berkeley National Laboratory's Molecular Foundry began work in 2010 to develop a window that would block heat-producing near-infrared (NIR) light without blocking visible light. Materials science provided the researchers with a solution: nanocrystals of indium tin oxide.

DOE-FUNDED BASIC RESEARCH

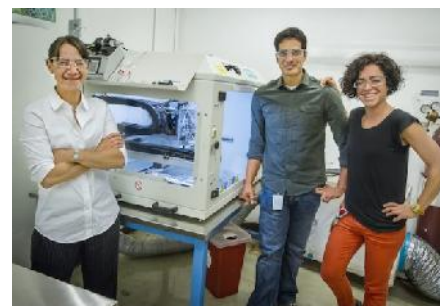
DEVELOPMENT

The researchers next discovered that embedding the nanocrystals in a niobium oxide glass matrix allowed control of both NIR and visible light. They designed a thin film coating with the material and created a window prototype in the fall of 2012 through a Berkeley Lab Innovation grant. The coating allowed the window to operate in three settings: bright, which let in both NIR and visible light; cool, which blocked NIR but allowed visible light; and dark, which blocked both NIR and visible light. The window



switched between settings through the application of a small electric charge. The researchers' findings were published in *Nature* in 2013.

DEPLOYMENT



Heliotrope Technologies, founded by two of the researchers, licensed the intellectual property from Berkeley Lab. The company received a \$3 million ARPA-E grant and \$1 million SBIR grant in 2013, and has since moved on to private funding. Company officials expect to hold a commercial scale product demonstration by early 2016.



INDUSTRY