

Electrochromic Image Projection Powered by Night-Vision Camera

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Keywords:

- Electrochromic material
- Night-Vision camera
- Solar power strips



**Electrochromic
Material on
Glass**

**Projected image of
people walking past
powered by computer
and seen in different
hues of blues**

**Motion-sensor night-vision
camera will be placed in
front of building**



Description of Electrochromic Material:

Electrochromic (EC) materials change color reversibly when an electric current is applied to them and have been developed for use in smart windows, switchable automotive rear view mirrors and flat panel displays. Electrochromic materials fall into two categories, ion insertion or reversible electrodeposition type. *Ion insertion* materials are thin film materials permanently attached to a transparent conducting substrate. Color change is effected by the simultaneous insertion (or ejection) of ions and electrons into the material. *Reversible electrodeposition* devices function by reversibly plating and stripping a thin film (like silver) onto a transparent substrate.

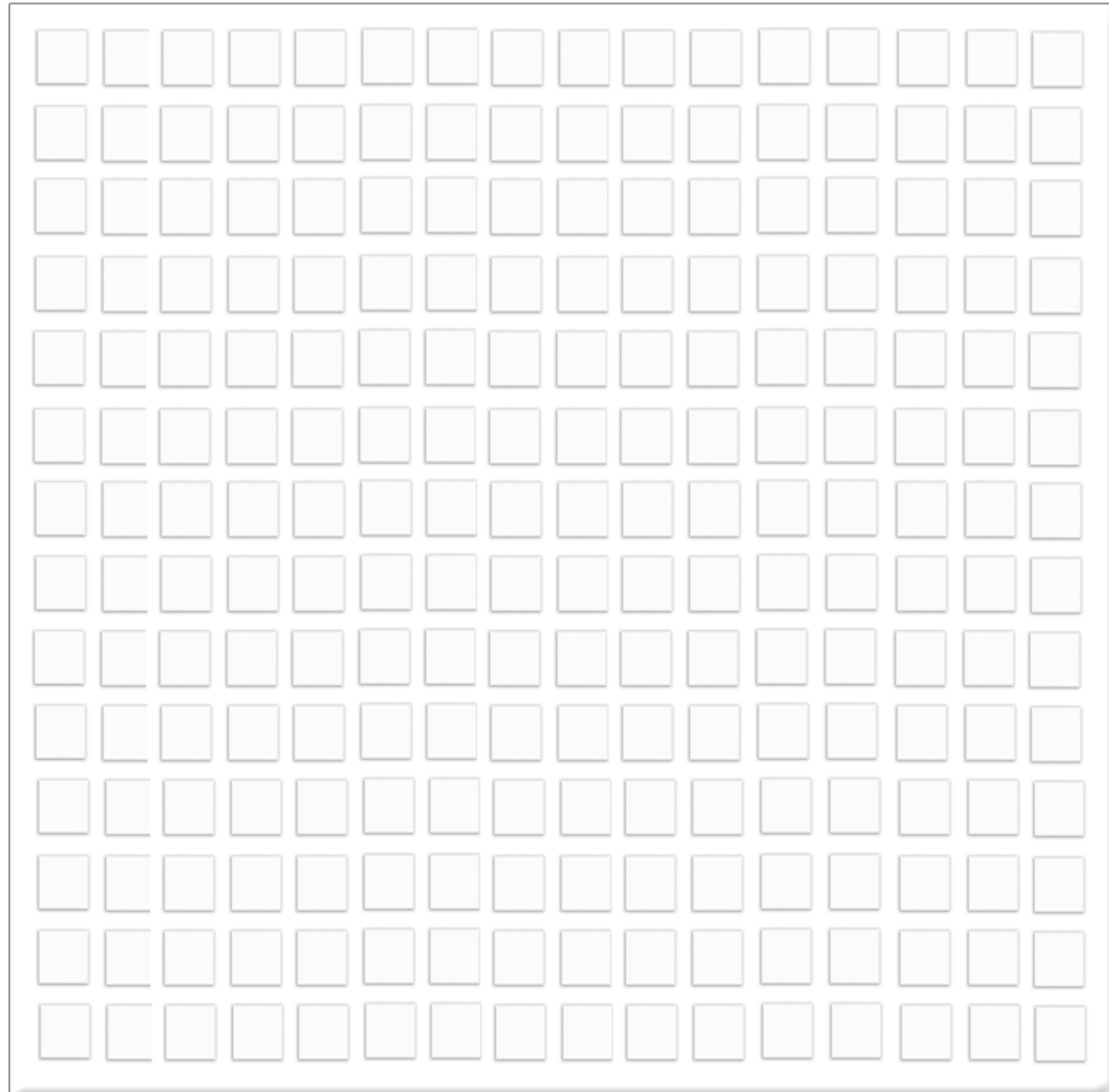
EC materials have an inherent memory that eliminates the need for continuous pixel refresh and can lower the power consumption. Power is only required when a pixel is switched. Furthermore, since these are non-emissive displays no external lighting source is needed under ambient lighting conditions.

What My Project Entails:

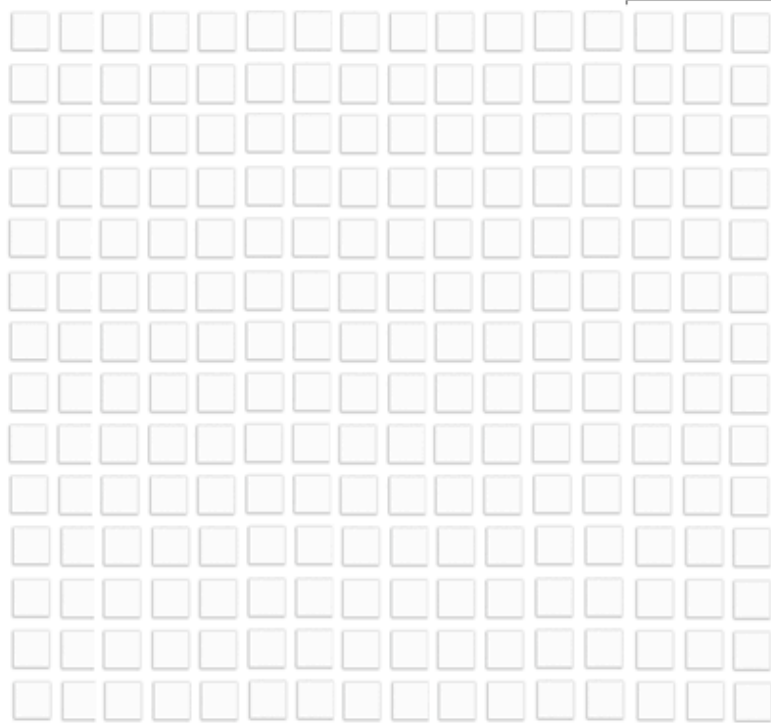
I am taking smart window technology (i.e. electrochromics) and turning it into a unique large area backlit display for nighttime application. The backlighting comes from the building interior and does not require energy. I am combining solar cells, flexible batteries, and night vision sensors with electrochromic technology. Electrochromic materials only use power when switched, so the image projected on the window space persists until it is changed. This saves power. In fact, these display devices act like batteries, since the EC material is charged and discharged when switched between clear and colored states. My project can also work towards cutting costs for the heating and cooling of a building because in the daytime, the displays can act as smart windows and lower the cooling costs for the building. Once the batteries are charged by the solar cells, any excess power can be used elsewhere in the building. The night vision (IR) camera can also be of more use than just capturing an image-the camera can be used to help deter theft since it displays images of people going by the building entrance.



**These are the
Pixels that will have
The electrochromic
Material on them,
While also being
Connected to a
Computer-activated
System (triggered
By the camera) and
Will be directed to
Either stay in the
Clear state, or change
Into a blue state.**



Electrochromic Pixels



160 Pixels

Each Pixel will be 2"x2"



Every pixel will be surrounded by solar cell strips on top of rectangular batteries.

320 Pixels

**Total:
51, 200
Pixels**



Electrochromic material will change from clear to different shades of blue when activated by camera and computer.

Solar cell with battery on back connected to a wire which sends and received data from computer.

During the day the windows may serve as “Smart Windows”



During the night, the art show begins



In Conclusion

In conclusion, by using electrochromic technology alongside a motion-activated night time camera, my project will display an innovative way to project an image onto the side of a building by changing the pixels between the clear-state and the blue-state. My project is also energy efficient and can serve to reduce the heating and cooling costs of a building during the day, while also serving as an anti-theft strategy during the night.