Reducing the Reflection of Light in Side View Mirrors at night using Electrochromism.

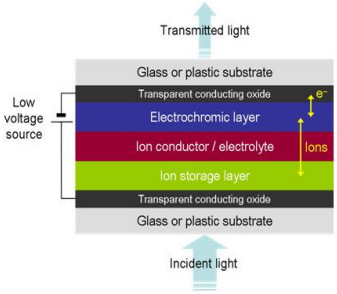
Vignesh Shanmuganathan+
Dr. Jani M Pallis+, Dr. Prabir Patra*+
+Department of Mechanical Engineering
***Department of Biomedical Engineering**
University of Bridgeport, Bridgeport, CT

Abstract

Every automobile has rear view mirrors and side view mirrors to make it easier for the driver to look at the rear side of the vehicle easily. They help the driver in moving the vehicle backwards without anyone's assistance. Usually, the rear view mirrors are located at the top of the windscreen and they are adjustable according to the position and viewing angle of the driver. During night times, the light from the head lights of the vehicle behind is reflected and falls directly on the eyes of the driver. This light reflection from the rear view mirrors causes a strain on our eyes and results in our eyes becoming tired and drowsy, consequently results in lack of alertness and can result in an accident. People who drive for more than 100 miles during the night experience this type of strain in their eyes. This can be avoided by reducing the reflection of light from the side view mirrors by implementing the process of electro chromism in the mirrors. By means of this process, we will be introducing a glass that changes the intensity of reflection when a voltage is applied.

Principle:

This system employs the concept of "Electrochromism". This process includes the active participation of electroactive materials that exhibit reversible variation in color by the application of a small DC voltage. This results in the occurrence of redox reactions between the electrochromic layer and the ion storage layer. And this is accompanied by the migration of ions between the involved layers to result in the compensation of charges.

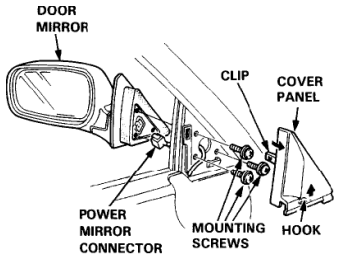


http://www.nanoeffects.eu/english/principle.html

Figure 1. Electrochromic setup for transmitting light

Existing system:

Rear view mirrors are mounted on both the front left hand side and right hand side doors. The side view mirrors comprises of the following parts as shown in Figure 2.



http://0.tqn.com/d/autorepair/1/0/Q/2/98837961.gif

Figure 2. Components of a side view mirror

Proposed system:

In the proposed system, an electrochromic glass is placed right in front of the mirror that acts as an interlayer that catches hold of the incoming light rays from the headlights of the vehicles approaching from the behind.
The process involved is explained below:-

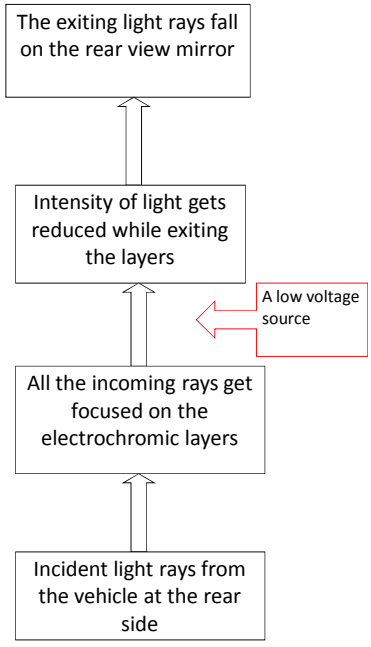


Figure 3. Working of an electrochromic glass module

How it works:

•The electrolytic setup is fixed right in front of the mirror to capture all the incoming light rays from the vehicle at the rear end.
•At night, the power control to the electrolytic module can be activated which can be done automatically when connected to the automatic headlights
•This module captures all the incoming light rays, reduces its intensity and emits it to the mirror that is behind.
•The emitted light rays then falls on the eyes of the driver and the intensity of light will be relatively lower than the light that directly falls on the eyes of the driver.
•During the day or when the sunlight is bright enough, the proposed module does not turn on.

Future improvements:

The concept of electrochromism can be embedded with all the glass windows present in the vehicle so that by activating the process, the intensity of light rays can be considerably reduced from entering into the vehicle.
This blocks the extra heat from entering into the vehicle and also blocks the UV radiation from entering the vehicle through the transparent glass windows. This consequently increases the life time and quality of the dashboard, leather seats and electronic console.
This feature can be added to the front glass also so that the intensity of head light rays from the oncoming traffic also can be reduced.

Conclusion:

By using the electrochromic glass to reduce the intensity of light, we can vary the levels of visibility by varying the amount of voltage supplied to the electrolytic bundle. It is the electro chromatic property that makes it change color.
We are surrounded by windows everywhere but we hardly think about redesigning them. With the advancement in these kinds of developing technologies, we can see the world with new light.