

APPENDIX 2

ABSTRACT OF EXHIBIT TAIWAN INTERNATIONAL SCIENCE FAIR

CATEGORY : Physics

TITLE : ESglasses

NAME : Wong Pui Wai, So Chun Kai

COUNTRY : Hong Kong, China

Contents of Abstract: (maximum 500 words) include

- a. Purpose of the Research
- b. Procedures
- c. Data
- d. Conclusions

Nowadays, many people are suffering from eye defects and thus eye-glasses play a vital role in their life. On a sunny day, bright light enters our eyes without any adjustment of light intensity, causing discomfort and harm to our eyes. Therefore, sunglasses are right here to satisfy our needs. However, it is very inconvenient for some people who suffer from eye sight problems to bring two pairs of glasses and change them frequently. In order to solve this problem, our Esglasses are designed to combine both glasses together.

To show the details of the physics theories behind our displays, we would like to illustrate the various components of a liquid crystal as well as the whole structure briefly. The liquid crystal we use is made up of molecules that have no positional order but tend to point in the same direction.

First of all, a sheet of I.T.O. glass is coated with a transparent film, which acts as an electrode. Secondly, these electrodes can set up a voltage across the cell for the orientation transition. Then, a polymer alignment layer is placed to leave a series of parallel microscopic grooves to help align the liquid crystal molecules in a preferred direction. This process helps to force the molecules of the liquid crystal between the alignment layers to twist.

Once the liquid crystal has been filled, the corner is sealed and the Polaroid can be coated on both sides of the surface of the transparent film with I.T.O. glass. The former one acts as a polarizer while the latter one acts as an analyzer. The polarizer can polarize light and the plane of the polarization of the polarized light is rotated by the molecules of the liquid crystal. Then the analyzer can allow the polarized light that has the plane of polarization perpendicular to the chain alignment in the analyzer to pass through.

Nevertheless, when the molecules align parallel to the applied electric field, plane-polarized light passing through it would not rotate the plane of polarization and half of the light cannot pass through the analyzer. Therefore, light intensity is reduced by half.

Finally, a combined lens which consists of two convex lenses are coated on the outer surfaces of the layers mentioned above. They possess the same function as the ones of normal eye-glasses.

In conclusion, our project, Esglasses, is an advancement to improve the quality of life. We make use of some simple applied physics theorems to modify our Esglasses to bring good news to those people wearing normal glasses.