The study of Solar filter for Solar observation

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Abstract

This project has an objective to study the attribute of materials which use in solar observation in reducing light and UV intensities to find the reducing percentage. Using Lux meter in measure light intensity and use UV meter in measure UV intensity. For the sample materials; there are welding helmet glass number10, 11, 12 and 13 black polymer film, mylar film, baader film, one and two layers of x-ray filmand a anack packaging**.**

From the study, sample material that has the best efficacy in reducing light intensity is black polymer film which has the percentage of reducing at 99.999% the next ones are two layers of x-ray film, welding helmet glass number 13, 12 and 11, mylar film, welding helmet glass number 10, baader film, snack packaging and one layer of x-ray film in order. And sample material that has the best efficacy in reducing UV intensity is black polymer film which has the percentage of reducing at 99.997% the next ones are welding helmet glass number 11, 12, 13 and 10, two layers of x-ray film, snack packaging, mylar film, bader film and one layer of x-ray film in order.

When using sample materials to observe the sun by taking photo through the telescope. Welding helmet glasses made the sun appearing in green. Mylar film, baader film and one layer of x-ray film made the sun appearing in monochrome. Black polymer film made the sun appearing in orange. Two layers of x-ray film made the sun appearing in red-orange. And a snack packaging made the sun appearing in pink

Introduction

Sunlight is a danger for the observers so filters are required to reduce the light and UV intensity. There are many kinds of filter that people mostly use and each one's efficacy in reducing the intensities are different which makes the results appear differently. To make the observation goes safely and has the best efficacy. The author is interested in studying the efficacy in reducing the intensities from the Solar through filters and photos from the telescope.

Materials and method

Materials

1. Welding helmet glass no.10, 11, 12 and 13
2. Black polymer film
3. Mylar film
4. Baader film
5. One and two layers of x-ray film
6. Snack packaging
7. Lux meter
8. UV meter
9. Catadioptric Telescope
10. DSLR camer

Method

1. Measure the light intensity
    1. Measure the light intensity directly from the smartphone's light.
    2. Use the filters with Lux meter censor and collect the data.
    3. Find the reducing percentage.
2. Measure the UV intensity
    1. Measure the UV intensity directly from the sunlight.
    2. Use the filters with UV meter censor and collect the data.
    3. Find the reducing percentage.
3. Take a photo through the telescope with DSLR camera.

Results and Discussion

Result 1 Measuring light and UV intensity

Sample Materials	Light intensity (LUX)			UV intensity (W/m^2)		
	Before	After	%	Before	After	%
Welding helmet glass no.13	4,720	0.04	99.999	17.50	0.001	99.994
Welding helmet glass no.12	4,720	0.14	99.997	19.54	0.001	99.995
Welding helmet glass no.11	4,720	0.16	99.997	36.12	0.001	99.997
Welding helmet glass no.10	4,720	1.48	99.969	17.73	0.001	99.994
Black polymer film	4,720	0.04	99.999	35.9	0.001	99.997
Mylar film	4,720	0.34	99.993	31.7	0.019	99.940
Baader film	4,720	2.26	99.952	31.96	0.042	99.869
One layer of x-ray film	4,720	34.32	99.273	31.9	0.261	99.182
Two layers of x-ray film	4,720	0.04	99.999	18.62	0.002	99.989
Snack packaging	4,720	13.52	99.714	17.78	0.004	99.978

Discussion

In study light intensity reducing, Data collection from the Solar has high deviation which caused by clouds so using light from smartphone instead of the sunlight is the solution. And collect the data directly from the Solar to study UV intensity. Data collection for UV intensity study also has deviation that also caused by clouds.

Conclusion

From the study, sample material that has the best efficacy in reducing light intensity is black polymer film which has the percentage of reducing at 99.999% the next ones are two layers of x-ray film, welding helmet glass number 13, 12 and 11, mylar film, welding helmet glass number 10, baader film, snack packaging and one layer of x-ray film in order. And sample material that has the best efficacy in reducing UV intensity is black polymer film which has the percentage of reducing at 99.997% the next ones are welding helmet glass number 11, 12, 13 and 10, two layers of x-ray film, snack packaging, mylar film, baader film and one layer of x-ray film in order.

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References

การสังเกตการณ์ดวงอาทิตย์. Retrieved from http://www.narit.or.th/index.php/2012-11-15-06-31-44/93-2012-11-22-02-05-38.

การสังเกตดวงอาทิตย์ทางตรงผ่านอุปกรณ์กรองแสง. Retrieved from http://www.it24hrs.com/2012/how-to-look-transit-of-venus/.