CALIFORNIA STATE SCIENCE FAIR
2011 PROJECT SUMMARY

Name(s)
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Project Number
S1812

Project Title
Effectiveness of Coatings of Differing Abrasiveness, Luster, and Color on Reflectivity at Three Different Wavelengths

Abstract

Objectives/Goals
Project was a continuation of a previous project that I had done. It concentrated its results on the variables of reflectivity rather than the variables of a stealth vehicle in the visible spectrum. A stealth coating should use these findings and incorporate them into a stealth coating design.

Methods/Materials
1) Panel (1) was situated at a specified distance from the beam source and 7.5cm x 20cm solar panel

2) Panel was clamped by a holding device (2) and a piece of flat wood was supporting the panel from the back to ensure the panel didn#t warp.

3) Solar panel (3) was positioned so would be perpendicular to he incoming light.

4) 200mW Red, Green, or Violet Laser (4) was mounted so it strikes the panel at dead center.

5) A visual porthole (5) was used to help guide the laser beam to the center of the panel.

6) A digital camera (6) was later installed to indirectly view the laser beam for eye safety reasons.

7) A volt meter (7) was used to measure the voltage produced by the received light on the solar panel.

Results
Abrasive materials had slight increase in reflectivity with finer material
Reflectivity varies with luster
Darker colors reflected less than lighter colors

Conclusions/Discussion
As ruggedness of abrasive decreased, voltage readout increased.
May be due to increase in specular reflection
Diffuse reflection would increase with reduction of FEPA rating for abrasive (coarseness)
With decreasing abrasiveness, there was increasing reflectivity
Darker colors absorb more light
Panel with greater luster will reflect more.

Summary Statement
This project intends to show how the variables of abrasiveness, luster, and color affect reflected light and how these findings could be applied to stealth technology in the visible spectrum.

Help Received
Dad helped with expenditures with purchases of materials