Answer #234

The answer is (d): the intensity of the reflected light will remain approximately the same. Light of any polarization will be reflected off a conducting surface, because no electric field can exist in a conductor. This is seen in the photograph at the right, in which the polarizing sheet has been rotated so that its axis as vertical, as seen by the arrows. Clicking on the photograph at the right will display an mpeg with the polarizing sheet rotating from horizontal to vertical.

So here is the test question. Suppose that we replace the aluminum surface by a piece of copper, as seen in the photograph below. When the polarizing sheet is rotated from horizontal to vertical, what will happen to the intensity of the reflected light?

When the polaroid is rotated by 90^{o} the intensity of the light will:

- (a) increase.
- (b) decrease noticeably.
- (c) decrease to zero.
- (d) remain nearly the same.

Click on the photograph after you have arrived at your anser and the reasoning behind that answer.

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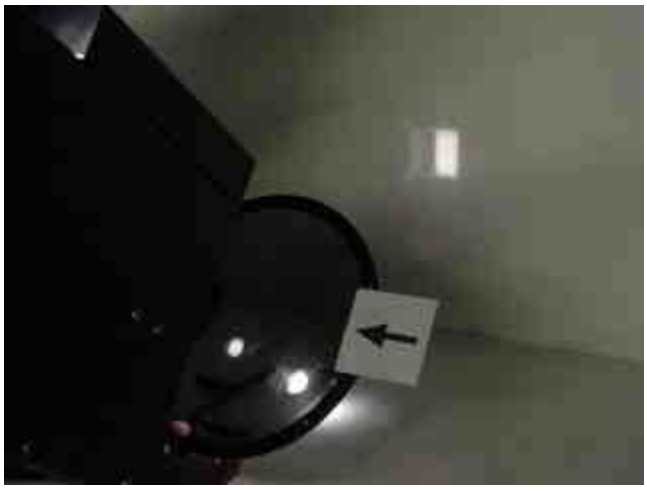
The answer is (d): the intensity of the reflected light will remain very nearly the same, although it does change color slightly. This is because copper, like aluminum, is a conductor, but unlike aluminum, it posses a distinct color. Clicking on the photograph at the right will display an mpeg with the polarizing sheet rotating from horizonatl to vertical.

Now that you are becoming an expert at this, here is the final test question. Suppose that the reflecting surface is a piece of glass, as shown in the photograph below. Click on the picture when you have settled on your answer.

When the polaroid is rotated by 90^{o} the intensity of the light will:

- (a) increase.
- (b) decrease noticeably.
- (c) decrease to zero.
- (d) remain nearly the same.



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The answer is (c): the intensity of the reflected light will decrease to zero. Glass is another dielectric. This is seen in the photograph at the right, in which the polarizing sheet has been rotated so that its axis as vertical, as seen by the arrows. Clicking on the photograph at the right will display an mpeg with the polarizing sheet rotating from horizonatl to vertical.

This behavior is the same for any dielectric when the angle of reflection is very close to the Brewster angle for that material. Maybe we got you by putting this one after reflection off the conducting sheets!

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