

## Answer to Question #52060 - Physics - Optics

### Question

For light of wavelength 589 nm, calculate the critical angles for the following substances when surrounded by air: a. fused quartz b. polystyrene, and c. sodium chloride

Solution

$$\theta_{crit} = \sin^{-1} \frac{n_2}{n_1}$$

$$\text{Fused quartz } \theta_{crit} = \sin^{-1} \frac{1.00029}{1.46} = 44^\circ;$$

$$\text{Polystyrene } \theta_{crit} = \sin^{-1} \frac{1.00029}{1.59} = 39^\circ;$$

$$\text{Sodium Chloride } \theta_{crit} = \sin^{-1} \frac{1.00029}{1.54} = 41^\circ;$$

**Answer:**  $44^\circ, 39^\circ, 41^\circ$  ;

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