

MP|399

$$n_i = 1.00$$

$$\theta_i = 65.0^\circ$$

$$\theta_R = 42.0^\circ$$

$$n_R = ??$$

air  $\rightarrow$  unknown liquid

$$n_i \sin \theta_i = n_R \sin \theta_R$$

$$(1.00)(\sin 65.0^\circ) = n_R (\sin 42.0^\circ)$$

$$n_R = \frac{(1.00)(\sin 65.0^\circ)}{(\sin 42.0^\circ)}$$

$$n_R = 1.35$$

MP|404

$$n_i = 1.00$$

$$\theta_i = 45^\circ$$

$$n_R = 1.54$$

$$\theta_R = ?$$

air  $\rightarrow$  ruby

$$n_i \sin \theta_i = n_R \sin \theta_R$$

$$(1.00)(\sin 45^\circ) = (1.54) \sin \theta_R$$

$$\sin \theta_R = \frac{(1.00)(\sin 45^\circ)}{1.54}$$

$$\theta = 27^\circ$$

MP|409

critical angle for diamond?

$$n_i = 2.42$$

$$\theta_i = ?$$

$$n_R = 1.00$$

$$\theta_R = 90^\circ$$

(definition)

diamond  $\rightarrow$  air

$$n_i \sin \theta_i = n_R \sin \theta_R$$

$$(2.42)(\sin \theta_i) = (1.00)(\sin 90^\circ)$$

$$\sin \theta_i = \frac{1.00}{2.42}$$

$$\theta_i = \sin^{-1} \left( \frac{1.00}{2.42} \right)$$

$$\theta_i = 24.4^\circ$$

$\rightarrow$  get refraction up to angle of incidence of  $24.4^\circ$

??|400, 405, 410

After  $24.4^\circ \rightarrow$  total internal reflection