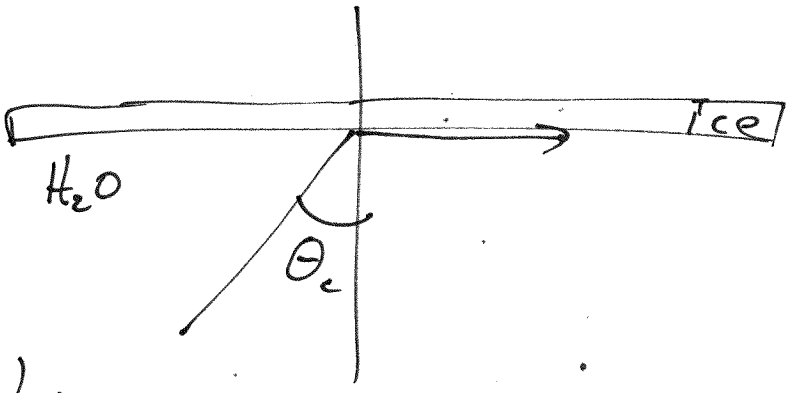
Ch.1 Prob.49

Find the angle where you get total internal reflection of light going from water to ice



Using Snell's Law

$$n_1 \sin\theta_1 = n_2 \sin\theta_2$$

$n_1 = n_{H_2O} = 1.333$

$n_2 = n_{ice} = 1.309$

The critical angle where light first reflects off the ice will correspond to where the refractive angle is 90°. Any ~~and~~ angle larger than this will also result in reflection.

So with $\theta_2 = 90°$, find θ_1.

$$\sin\theta_1 = \frac{n_2}{n_1}\sin\theta_2$$

$$\sin\theta_c = \frac{1.309}{1.333}\sin 90° = \frac{1.309}{1.333} = 0.9820$$

$$\theta_c = 79.11°$$