3.46 PHOTONIC MATERIALS AND DEVICES

Homework Assignment 1—February 8, 2006

Due: February 15, 2006

	$\frac{\varepsilon}{\varepsilon_0}$ (static)	n (υ)
Si	11.7	3.5
Ge	16	4
$LiNbO_3$	43	2.27
BaT_1O_3	3600	2.46

1. What is the expected relationship between $\frac{\varepsilon}{\varepsilon_0}$ (dielectric constant) and n (index of refraction)?

2. Give an estimate of the frequency υ (Hz) for an optical wave in the near infrared?

3. Why do the elemental materials differ from the oxides in the observed relationship between $\frac{\varepsilon}{\varepsilon_0}$ (static) and n (υ)?