Problem set #12; due Thursday, April 17, in class.

1. Recall that the Compton shift is given by

$$\Delta\lambda = \lambda_C \left(1 - \cos\theta_s\right) \tag{1}$$

$$\lambda_C = \frac{h}{m_0 c} = 2.43\text{pm} \tag{2}$$

where θ_s is the scattering angle (not the Bragg angle). What is the shift in energy for Compton scattering of a Cu K_α x-ray when $\theta_s = 60°$? Is this energy change large or small compared to the binding energy of valence electrons?