

NAME _____

HW 4 See website for due date

Prof. S. H. Garofalini

Your company's new x-ray diffractometer was innovative. The Pb shield that was previously used to surround the Cu x-ray source was 0.085 cm thick. Being a materials scientist, and environmentally 'green', you used corundum, Al_2O_3 , rather than lead, Pb, to surround the Cu x-ray source to get the same equivalent x-ray shielding as the Pb. However, your company now has \$50,000,000 in law suits from a group that said that even though all the shields were in place and undamaged, users must have received more radiation exposure because Pb was not used as the protective shield.

Calculate the thickness of your Al_2O_3 shield and prove that the thickness of the Al_2O_3 protective material that you used would result in an equivalent exposure of the x-rays from escaping as in the Pb case, thus nullifying their complaint.