

Questions: Text book assignment #12

12-6 For Mo  $K_{\alpha}$  radiation (0.711 Å), the mass absorption coefficients for K, I, H, and O are 16.7, 39.2, 0.0, and 1.50 cm<sup>2</sup>/g, respectively.

(a) Calculate the mass absorption coefficient for a solution prepared by mixing 8.00 g of KI with 92 g of water.

(b) The density of the solution described in (a) is 1.05 g/cm<sup>3</sup>. What fraction of the radiation from a Mo  $K_{\alpha}$  source would be transmitted by a 0.50 cm layer of the solution?

12-9 Calculate the goniometer setting, in terms of  $2\theta$ , required to observe the  $K_{\alpha_1}$  lines for Fe (1.76 Å), Se (0.992 Å), and Ag (0.497 Å) when the diffracting crystal is (a) topaz;

(b) LiF; (c) NaCl.

12-11 Calculate the minimum tube voltage required to excite the following lines. The numbers in parentheses are the wavelengths in Å for the corresponding absorption edges.

(a) K lines for Ca (3.064 Å)

(b)  $L_{\alpha}$  lines for As (9.370 Å)

(c)  $L_{\beta}$  lines for U (0.592 Å)

(d) K lines for Mg (0.496 Å)

12-12 Manganese was determined in samples of geological interest *via* X-ray fluorescence using barium as an internal standard. The fluorescence intensity of isolated lines for each element gave the following data:

Weight % Mn	Counts per second	
	Ba	Mn
0.00	156	80
0.10	160	106
0.20	159	129
0.30	160	154
0.40	151	167

What is the weight percent manganese in a sample that had a Mn/Ba count ratio of 0.886?