

Homework #1

Chem 475

1. If you have a self assembled monolayer of 11-amino-1-undecanethiol on gold that is analyzed by (a) XPS and (b) EDX. What is the difference of the relative ratio of Au:S:C:N going to be? Why? (You don't need exact numbers just the relative intensity.)
2. Burning 1.00000 g of a organic compound in a combustion analysis apparatus gives 0.46387 g of H₂O, 1.81307 g of CO₂, and 0.28851 g of N₂. The melting point was found to be 235 °C. What is the elemental ratio? What is it? (Show your calculations)
3. A sample of mineral nanoparticles is analyzed by AA or ICP-AES. The results indicate that it contains *by weight* 5.03% Be, 31.35% Si, and 10.04% Al. What is the mineral formula? What have you assumed that it also contains? Is this a reasonable assumption? Why? What is the common name for the mineral? If I dope it with small amounts of chromium it adopts a characteristic color, what is the color?