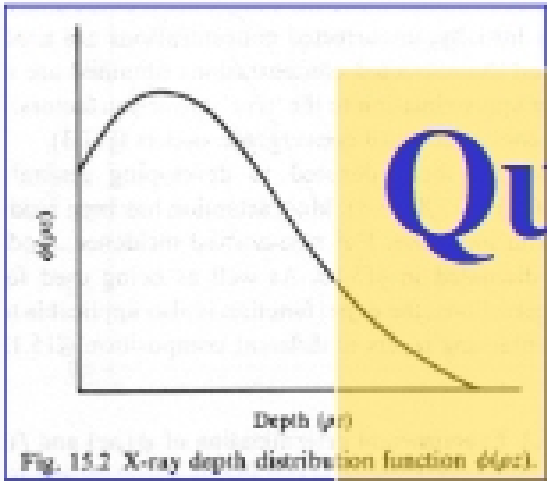
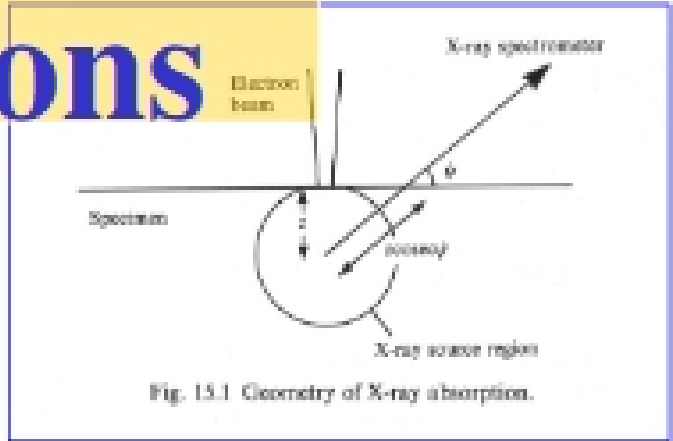


# Electron Probe Microanalysis EPMA



## Quantitative Analysis and Matrix Corrections





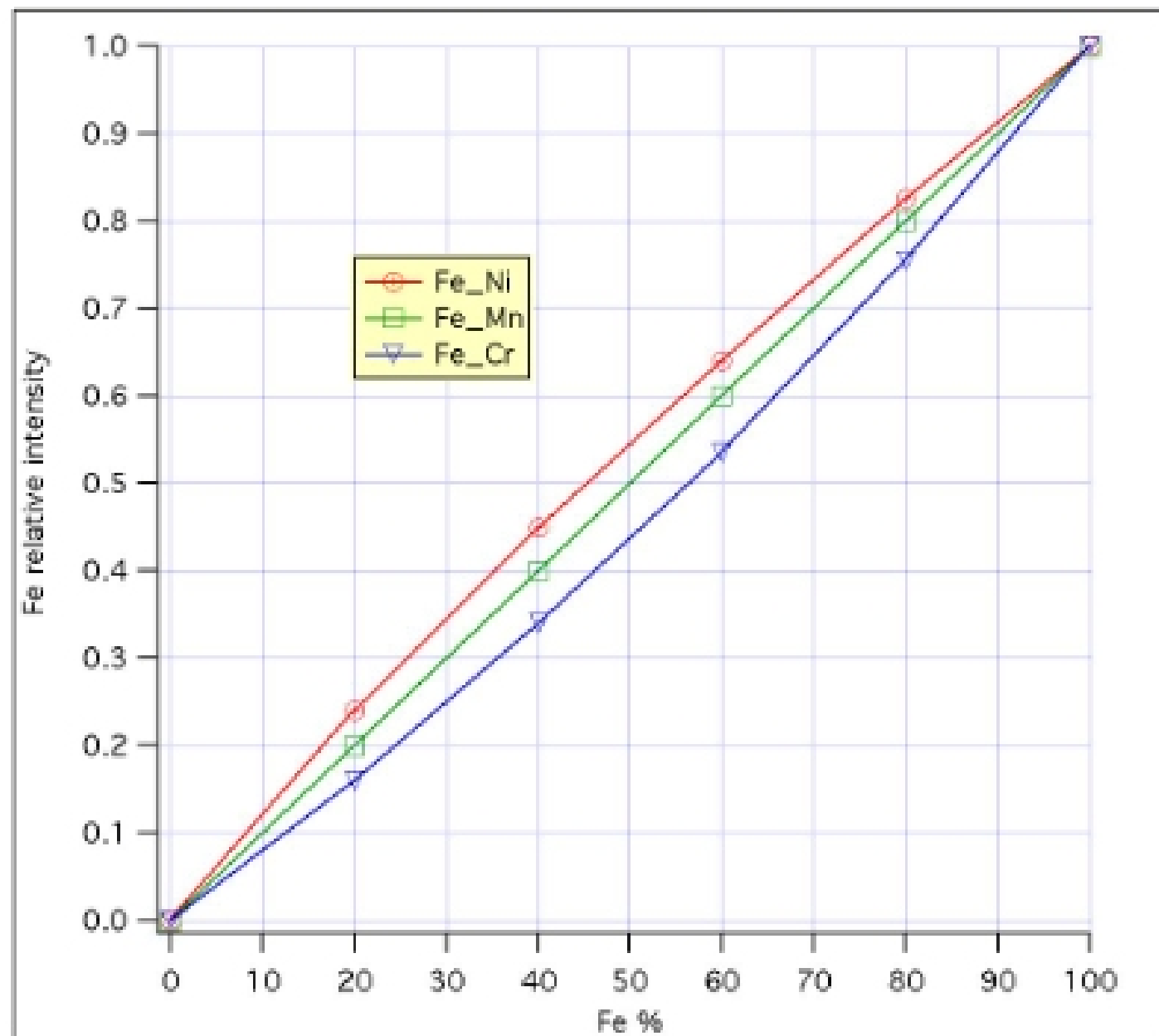
# Main Point

- For a hypothetical compound that is 50 wt% of Element A and 50 wt% Element B, the x-ray intensities of Element A and Element B will never (except in rare isolated cases) be some simple ratio equal to the composition!
- Therefore some corrections need to be applied
- This is the “matrix correction” (the matrix is the matrix of elements in the material)
- It can be some empirical correction, or a highly sophisticated physically model (or something in between)



# Raw data needs correction

This plot of Fe Ka X-ray intensity data demonstrates why we must correct for matrix effects. Here 3 Fe alloys show distinct variations. Consider the 3 alloys at 40% Fe. X-ray intensity of the Fe-Ni alloy is ~5% higher than for the Fe-Mn, and the Fe-Cr is ~5% lower than the Fe-Mn. Thus, we cannot use the raw X-ray intensity to determine the compositions of the Fe-Ni and Fe-Cr alloys. ●



(Note the hyperbolic functionality of the upper and lower curves)