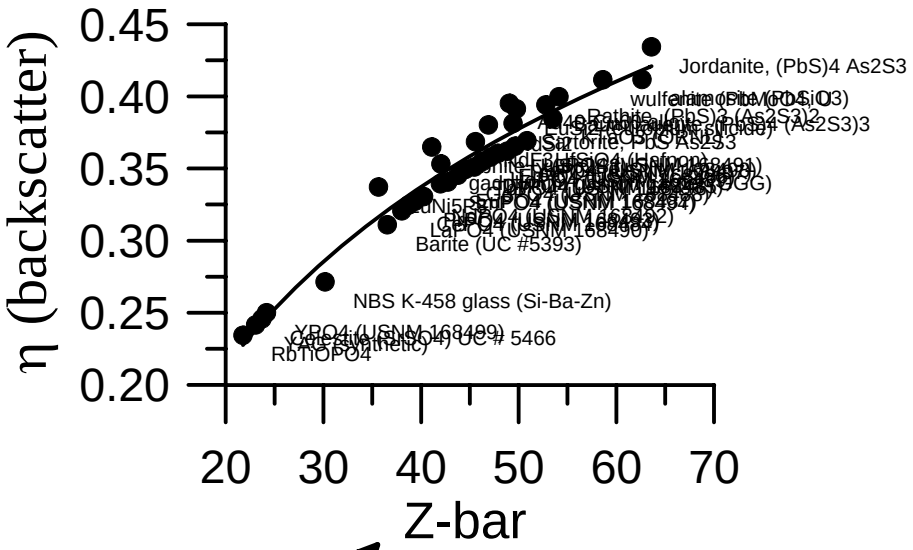
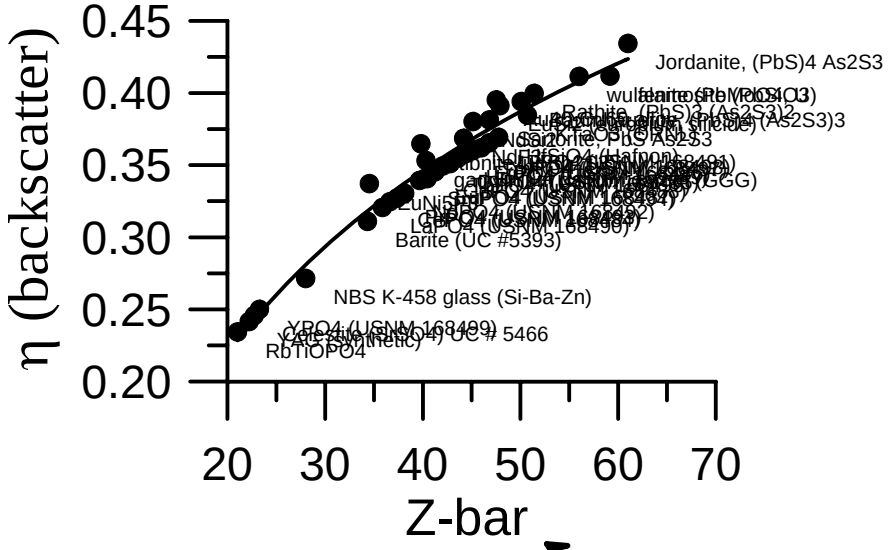
Penepma 2008 (Penelope) monte-carlo calculations, 10^6 trajectories

Mass fraction averaged, $A^{1.0}$



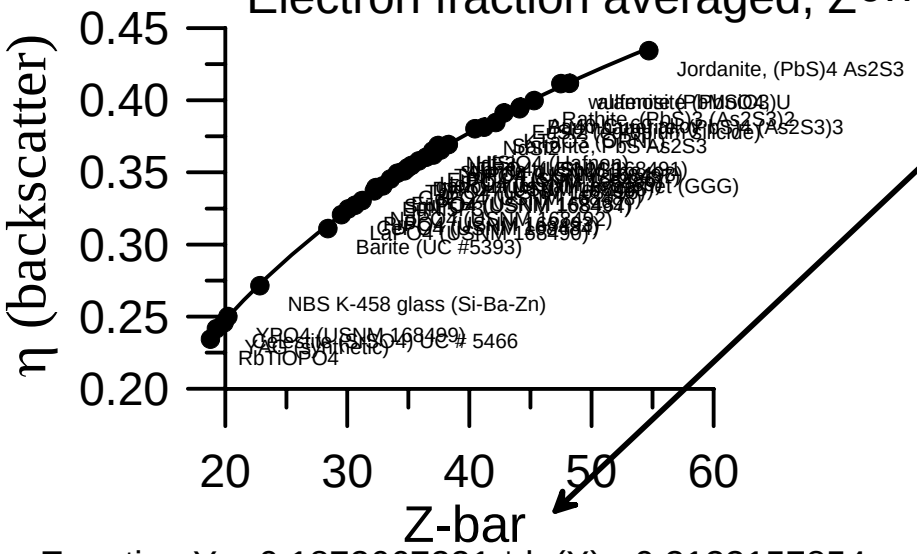
Equation Y = 0.1803893227 * ln(X) - 0.3281861311
Coef of determination, R-squared = 0.95351

Electron fraction averaged, $Z^{1.0}$



Equation Y = 0.1833616971 * ln(X) - 0.3301333798
Coef of determination, R-squared = 0.967793

Electron fraction averaged, $Z^{0.7}$



Equation Y = 0.1872667221 * ln(X) - 0.3133157854
Coef of determination, R-squared = 0.999242

$$\overline{Z}_{(c_i Z_i)} = \sum_{i=1}^{n} c_i Z_i$$

where, c is the mass fraction and Z is the atomic number

$$\overline{Z}_{(z_i^{(x)} Z_i)} = \sum_{i=1}^{n} z_i^{(x)} Z_i$$

where, $z^{(x)}$ is the electron fraction and Z is the atomic number

$$z_i^{(x)} = \frac{a_i Z_i^{\,x}}{\sum_{i=1}^{n} a_i Z_i^{\,x}}$$

where, a is the atomic fraction, Z is the atomic number and x is an exponent