1. a) net charge: -3.20×10^{-9} C
e^-: -1.602×10^{-19} C / electron

$$\frac{\text{net charge}}{\text{charge}/\#e^-} = \#e^-$$

$$\frac{-3.20 \times 10^{-9}\ \text{C}}{-1.602 \times 10^{-19}\ \text{C}/e^-} = \#e^-$$

$$\doteq 2.00 \times 10^{10} \text{ electrons.}$$

$\therefore$ There's 2.00×10^{10} excess electrons on the sphere.

b) $m = 8.000\ g$
$M = 207\ g/mol$
$N_A = 6.02 \times 10^{23}$ atoms/mol
$\#e^- = 2.00 \times 10^{10}\ e^-$

$$n = \frac{m}{M}$$

$$= \frac{8.000\ g}{207\ g/mol} = 0.0386\ mol$$

$$\#\text{atoms} = n N_A$$

$$= 0.0386\ mol\ (6.02 \times 10^{23}\ \text{atoms/mol})$$

$$= 2.33 \times 10^{22} \text{ atoms.}$$

$$\frac{2.00 \times 10^{10} \text{ excess } e^-}{2.33 \times 10^{22} \text{ atoms}} = 8.58 \times 10^{-13} \text{ excess } e^- \text{ per 1 atom.}$$

Hilroy