Now, solving for A in Equation 18.11

$$A = \frac{\rho_i}{c'_{\rm Ni} \left(1 - c'_{\rm Ni}\right)}$$

$$= \frac{1.73 \times 10^{-7} (\Omega - m)}{(0.107)(1 - 0.107)} = 1.81 \times 10^{-6} (\Omega - m)$$

Now it is possible to compute the c'_{Ni} to give a room temperature resistivity of 2.5 x 10⁻⁷ Ω -m. Again, we must determine ρ_i as

$$\rho_i = \rho_{\text{total}} - \rho_t$$

= 2.5 x 10⁻⁷ - 1.67 x 10⁻⁸ = 2.33 x 10⁻⁷ (Ω - m)

If Equation 18.11 is expanded, then

$$\rho_i = A c'_{\rm Ni} - A c'_{\rm Ni}^2$$

Or, rearranging this equation, we have

$$Ac_{\mathrm{Ni}}^{\prime 2} - Ac_{\mathrm{Ni}}^{\prime} + \rho_i = 0$$

Now, solving for c'_{Ni} (using the quadratic equation solution)

$$c'_{\rm Ni} = \frac{A \pm \sqrt{A^2 - 4A\rho_i}}{2A}$$

Again, from the above

$$A = 1.81 \times 10^{-6} (\Omega-m)$$

 $\rho_i = 2.33 \times 10^{-7} (\Omega-m)$

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