$$Q_{\rm scatter} \quad = \quad \frac{8}{3}\left(\frac{2\pi a}{\lambda}\right)^4 \left[\frac{n^2-1}{n^2+1}\right]^2$$

$$\text{energy absorbed per second} \quad = \quad Q_{\rm abs}\,\varepsilon c\,(\pi a^2)$$

$$Q_{\rm abs} \quad \simeq \quad 0.8\left(\frac{a}{0.1\,\mu\mathrm{m}}\right)^{0.85}$$

$$\text{energy radiated per second} \quad = \quad Q_{\rm emit}\,(4\pi a^2)\,\sigma T^4$$

$$Q_{\rm emit} \quad \simeq \quad 3.2\times 10^{-4}\left(\frac{a}{0.1\,\mu\mathrm{m}}\right)\left[\frac{T}{20\,\mathrm{K}}\right]^2$$

$$(1-\text{albedo})\;F\;\left(\pi R^2\right) \quad = \quad (\text{emissivity})\;\left(4\pi R^2\right)\;\sigma T^4$$

$$0.8\left(\frac{a}{0.1\,\mu\mathrm{m}}\right)^{0.85}\;\left(10^{-13}\;c\right)\;\left(\pi a^2\right) \quad = \quad 3.2\times 10^{-4}\left(\frac{a}{0.1\,\mu\mathrm{m}}\right)\left[\frac{T}{20\,\mathrm{K}}\right]^2\;\left(4\pi a^2\right)\;\sigma T^4$$

$$L \quad = \quad (\text{Area})\,\sigma T^4 \quad = \quad (4\pi r^2)\,\sigma T^4$$