31. (a) Using Eq. 42-4, the energy released would be

$$\begin{aligned} E &= NE_{\text{avg}} \\ &= \frac{(3.1\,\text{g})}{(63.54\,\text{g/mol})/(6.02\times 10^{23}/\text{mol})}\left(\frac{3}{5}\right)(7.0\,\text{eV})(1.6\times 10^{-19}\,\text{J/eV}) \\ &= 1.98\times 10^{4}\,\text{J} \approx 20\ \text{kJ}\ . \end{aligned}$$

(b) Keeping in mind that a Watt is a Joule per second, we have

$$\frac{1.98\times 10^{4}\,\text{J}}{100\,\text{J/s}} = 198\ \text{s}\ .$$