

34. Using Eq. 43-14 and Eq. 43-17 (and the fact that mass is proportional to the number of atoms), the amount decayed is

$$\begin{aligned} |\Delta m| &= m|_{t_f=16.0\text{ h}} - m|_{t_i=14.0\text{ h}} \\ &= m_0(1 - e^{-t_i \ln 2/T_{1/2}}) - m_0(1 - e^{-t_f \ln 2/T_{1/2}}) \\ &= m_0(e^{-t_f \ln 2/T_{1/2}} - e^{-t_i \ln 2/T_{1/2}}) \\ &= (5.50\text{ g}) \left[ e^{-(16.0\text{ h}/12.7\text{ h}) \ln 2} - e^{-(14.0\text{ h}/12.7\text{ h}) \ln 2} \right] \\ &= 0.256\text{ g} . \end{aligned}$$