14. (a) The surface area a of a nucleus is given by $a \simeq 4\pi R^2 \simeq 4\pi[R_0 A^{1/3}]^2 \propto A^{2/3}$. Thus, the fractional change in surface area is

$$\frac{\Delta a}{a_i} = \frac{a_f - a_i}{a_i} = \frac{(140)^{2/3} + (96)^{2/3}}{(236)^{2/3}} - 1 = +0.25 \ .$$

(b) Since $V \propto R^3 \propto (A^{1/3})^3 = A$, we have

$$\frac{\Delta V}{V} = \frac{V_f}{V_i} - 1 = \frac{140 + 96}{236} - 1 = 0 \ .$$

(c) The fractional change in potential energy is

$$\begin{aligned} \frac{\Delta U}{U} &= \frac{U_f}{U_i} - 1 \\ &= \frac{Q_{\rm Xe}^2/R_{\rm Xe} + Q_{\rm Sr}^2/R_{\rm Sr}}{Q_{\rm U}^2/R_{\rm U}} - 1 \\ &= \frac{(54)^2(140)^{-1/3} + (38)^2(96)^{-1/3}}{(92)^2(236)^{-1/3}} - 1 \ = \ -0.36 \ . \end{aligned}$$