104. The energy (which was originally in the form $K = \frac{1}{2}mv^2$) dissipated as a result of friction melts a portion of mass m. Therefore,

$$\begin{aligned} \frac{1}{2}(50.0\,\text{kg})(5.38\,\text{m/s})^2 &= mL_F \\ 723\,\text{J} &= m(333\,\text{kJ/kg} \end{aligned}$$

which, for consistency of the energy units, is best written $723\,\text{J} = m(333\,\text{J/g})$. This yields $m = 2.17$ g.