Answer on Question #73300, Chemistry / General Chemistry

How many kilocalories are required to raise the temperature of gold from 500C to 1064C and melt all the gold to liquid at 1064C? 9170 g specific heat is 0.129 J/gC heat of fusion 63.6 J/g.

Solution

$Q_{tot} = Cm(T_2 - T_1) + \lambda m$, where C – specific heat, m – mass, λ – heat of fusion;

$Q_{tot} = 0.129 \times 9170 \times (1064\text{-}500) + 63.6 \times 9170 = 667172.52 + 583212 = 1250384.52$ (J)

Convert J into kkal if 1 kkal = 4184 J :

$Q_{tot} = \frac{1250384.52}{4184} =$ **298.85 kkal**

Answer

298.85 kkal are required to raise the temperature of 9170 g of gold from 500°C to 1064°C and melt it to liquid at 1064°C.