

When ever there is a change of state and the temperature remains the same the energy can be calculated by the formula

$$E = m L$$

Mass in kg, L can be the fusion value or vaporization value depending on the question.

1. How much energy is required to change the state of 2 kg of water from solid to liquid without change in temperature

Solid to liquid so use fusion value

$$\begin{aligned} E &= mL \\ &= (2)(335000) \\ &= 670,000J \end{aligned}$$

2. How much energy is required to change the state of 3 kg of water from liquid to gas without change in temperature

3. How much energy is required to change the state of 1.2kg kg of alcohol from liquid to solid without change in temperature

4. How much energy is required to change the state of 0.75 kg of alcohol from gas to liquid without change in temperature