

Please show all equations, all work, all calculations, and explain fully to receive credit

1. 15.4 grams of water was placed in a container and gained 30.0 J of heat energy. Calculate the change in entropy for this water at a temperature of 298K. Show all units.

2. A 150 gram metal container lost 30.0 J of heat energy when water was placed in it. Calculate the change in entropy for the metal container at a temperature of 303K.

3. Use fundamental science principles and your answers to the two previous questions to explain the real underlying reasons for why the metal container lost energy, why the water gained energy, and why the reverse process did not occur.

4. Determine the range of temperatures over which this reaction is spontaneous; fully support your answer.

