Note: This problem requires both mechanical energy and heat energy for a solution.

In a classic demonstration, a 2.0-gram lead bullet is shot into a 2.0-kg block of wood. The block of wood with the bullet stuck in it was hung from a string and rose to a height 0.50 cm above its initial position. From that information we calculated that the initial speed of the bullet was almost 315 m/s (close to the speed of sound). What was the bullet like when it stopped? Using conservation of energy and conservation of momentum, we decided that the internal energy of the bullet, block system had increased substantially. If the change of internal energy of the bullet was half that of the system, would this change be enough to melt the bullet? Assume that the bullet had a temperature of 50 $^{\circ}$C when it left the gun. The melting temperature of lead is 330 $^{\circ}$C. It has a specific heat capacity of 130 J/(kg $^{\circ}$C) and a latent heat of fusion of 25 J/g. The specific heat capacity of the oak wooden block is 2000 J/(kg $^{\circ}$C). If you find that the bullet actually melted a bit what would that indicate?