

## Thermal Energy of an Elemental Solid

The atoms are no longer free to move about; instead they are trapped between their neighbors and attached to them.

Thus, each atom has an increased  $PE_e$  associated with its POS relative to its neighbors whenever it is off-center.

As each atom moves, sometimes its ME is mostly KE but sometimes its ME is mostly  $PE_e$ . On average, half the time, the ME for each atom is mostly KE and half the time the ME for each atom is mostly  $PE_e$ . At any time, half the total ME of all the atoms in the solid is KE and half is  $PE_e$ .

The ThE is the total ME associated with the RANDOM motions of the atoms as they VIBRATE about their central POS's; half this ME is KE and half is  $PE_e$ .

