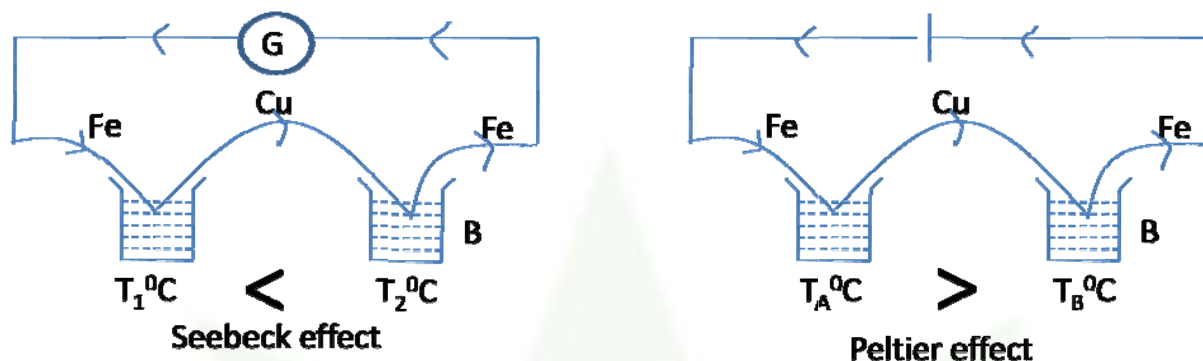




Peltier Effect

Peltier effect: It is just the reverse of Seebeck effect

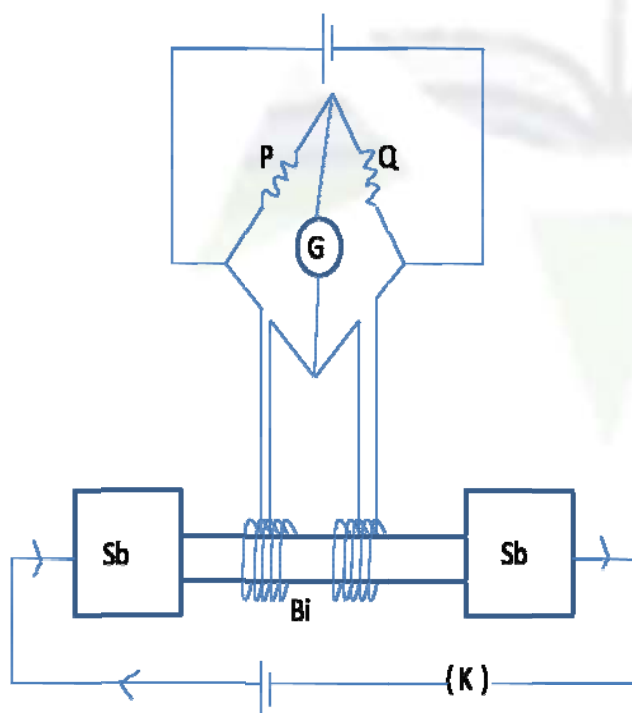


A copper iron thermo couple is taken. A & B are the two junction and the temperature at the two junctions are same. A current is passed through that thermo couple by using a battery or key. On passing current through the thermo couple it is found that the temperature at the two junction become different. This phenomenon is known as Peltier effect.

Comparing the two figures we find that in Peltier effect the junction "A" gets heated in which it has to be kept cold in Seebeck effect to get current in the same direction as flowing in Peltier effect. If we reverse the direction of current the temperature at the two junctions also gets reversed.

Peltier effect is said to be reversible effect.

Demonstration of Peltier effect : A composite rod of antimony and bismuth is taken.



Two insulated coils of exactly same resistance are wound at the two junctions of that composite rod and are connected at the 3rd and 4th arm of a Wheatstone bridge.

The ratio arms are kept equal i.e. $P/Q=1$ and since $R/S=1$ hence the bridge is balanced and galvanometer gives null deflection.

By closing the key K, current is passed through the composite rod and it is found that on passing current the galvanometer in the bridge shows deflection indicating that the bridge is thrown out of balance.

Which means that the resistance of the two coils have changed this suggests that the temperature at the two junctions must have changed on passing current through the thermocouple due to which the resistance of the two coils have changed. This proves Peltier effect.

Difference between Peltier effect and Joules effect :



Peltier Effect

Peltier effect	Joules effect
1.A circuit of two dis-similar metals is required.	1.Heat can be produced by passing current through single conductor.
2.Temperture is different at different points on the conductor.	2.The temperature is same throughout the length of the conductor.
3.Heat produced is proportional to the current flowing through the conductor.	3.Heat produced is proportional to the square of the current $H \propto i^2$
4. Peltier effect is reversible .	4. Joules effect is irreversible .