Thomson Effect:

When two ends of a conductor are kept at different temperatures and current is passed through the conductor, heat is absorbed or released in conductor. This process is called as Thomson's effect.

The Thomson's effect is reversible effect.

Positive Thomson Effect:

In case of **copper** wire, if an electric current is passed from hot end to cold end, heat is released. And if current is passed from cold end to hot end, heat is absorbed. This effect is called positive Thomson effect.

Other metals showing positive Thomson's effect are: Sb, Ag, Cd, Zn etc.

Negative Thomson Effect:

In case of **Iron wire**, if an electric current is passed from hot end to cold end, heat is absorbed. And if current is passed from cold end to hot end, heat is released. This effect is called Negative Thomson effect.

Other metals showing negative Thomson's effect are: Bi, Pt, Co, Ni etc.

Zero Thomson Effect:

In case of **lead** wire, whose ends are maintained at different temperatures, not heat is absorbed or released as current is passed through it (through any direction). This effect is called zero Thomson Effect. Due to this reason Lead (Pb) is take as standard reference metal in thermoelectric series.

Applications of Thermoelectric Effect:

Thermopile:

A thermopile is a device works on the principle of thermoelectric effect which is used to measure the intensity of radiation. It is made by connecting number of thermocouples in series. Being in series, the thermo-emf get added up and give rise to sizable emf. The thermocouples are made of Bismuth (Bi) and Antimony (Sb).

Here, as shown in figure, one set of junctions (**1,3,5**) are painted black and are exposed to the radiation and become hot easily. The other set of junctions (**2,4**) are shielded from radiations so that they remain cool.

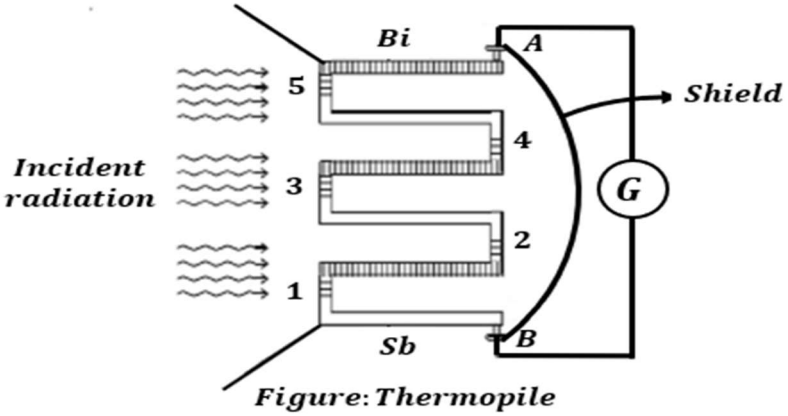

Figure: Thermopile

Working:

As the thermal radiation fall on the thermopile (as shown in figure), the thermos emf is generated, which is indicated by the deflection of galvanometer. The galvanometer is so calibrated that the deflection in it is directly proportional to the intensity of radiation.

NB: See beck Effect, Peltier's Effect and Thomson's Effect are reversible but Joule's Effect is irreversible.