THOMSON EFFECT

"Thomson Effect is the absorption (or evolution) of energy due to the flow of current in an unequally heated single Conductor."

Let us take a thick copper rod with the ends maintained at the same constant temperature and the centre maintained at a much higher temperature. If no current flows in the Conductor temperature at the ends will not differ. But say, the current flows from left to right. the left end will be cooler than the right end.

If a charge ΔQ passed through a small section of the wire having a temperature difference ΔT between the ends, the Thomson heat is

$$\Delta H = \sigma(\Delta Q)(\Delta T) \quad \text{---(i)}$$

Where σ is a Constant for a given metal at a given temperature. The quantity

$$\sigma\Delta T = \frac{\Delta H}{\Delta Q} = \frac{\text{Thomson heat}}{\text{Charge transferred}}$$

is Called the Thomson emf.

the Constant σ is Called the Thomson Coefficient.