

Brief introduction of Thermal radiation

Part II

Perfect black body:- A body which absorbs heat radiation of all wave lengths which fall on it, and emits the full radiation on being heated is called Perfect black body.

A perfect black body neither reflects nor transmits any part of the incident heat radiation and hence black irrespective of the colour of the incident radiation.

A Perfect black body, when heated, emits radiation of all possible wave lengths at that temperature. The wave length range of emitted radiation is independent of the material of the body and depends only on the temperature of the black body.

A black body has absorptivity unity ($\alpha=1$) and also emissivity ($e=1$).

Since no body is perfect black body in practice, however a surface coated with lamp black or platinum black absorbs about 98% of heat radiation falling on it.

Fery's black body:- Fery designed a perfectly black body which consists

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of a double walled hollow sphere having a small opening 'O' on one side and a conical projection 'P' just opposite to it. Its inner surface is coated with lamp black.

The heat radiation entering the hollow sphere through opening 'O' get completely absorbed due to multiple reflection. The chance of heat radiation getting out through the opening is reduced by the conical projection and the lamp black coating.

When the body is heated, it emits full radiation spectrum at that temperature. The radiations coming out through the opening 'O' acts as the black body. The radiation coming out through the opening from inner surface of the hollow sphere is called cavity radiation.

The black body designed by Fery is shown in the figure.

