In your own words write a summary of the topics about radiative heat transfer we went through including the definitions of emissivity, absorptivity and reflectivity, the view factor, the heat exchange between two black surfaces, the heat exchange between the two gray surface and finally the definition of radiative resistances.

Emissivity

emissivity is the ratio of the thermal radiation from a surface to the radiation from an ideal black surface which is known as black body at the same temperature. It is a dimensionless number between 0 (for a perfect reflector) and 1 (for a perfect emitter).

Absorptivity

It refers to the effectiveness of the surface of a kind of material in absorbing radiant energy. It is the ratio of the absorbed to the incident radiant power. Under ideal conditions, the object that can absorb all the rays is a black body, of which the absorption rate is 1. However, in normal state, the absorption rate depends on the material, roughness and temperature of the surface of the object and is related to the wavelength range and angle of incidence of the received heat rays, so it is difficult to reach the rate of 1.

Reflectivity

The effectiveness in reflecting radiant energy of the surface of the material is defined as reflectivity. It is used to describe how much light can the material could reflect. It occurs always on the surface of the material.

View factor

The view factor F12 is the fraction of energy exiting an isothermal, opaque, and diffuse from surface 1 (by emission or reflection), that directly to the surface 2.

The heat exchange between two black surfaces

Each of the black surface could absorb and reflect all the radiation. It is known that the heat emitted from the surface of the first object surface and reaching the surface of the second object is exchanged with the heat known to be emitted from the surface of the second object and reaching the surface of the first object.

The heat exchange between the two gray surface

Each grey surface would absorb and reflect part of the radiation, and the reflected part would continue absorbed by the other side and reflect the other radiation, during which the power of the radiation would become smaller and smaller.

The definition of radiative resistances

It is the thermal resistance of two objects with different temperatures radiating heat to each other.

Find the radiative heat transfer between surface 1 and 2. The area is 1.5 ㎡, ε1 = 0.2，ε2 = 0.7， T1 = 37℃，T2 = 17℃. After that, compare the results when ε1=ε2=0.1 and what can you conclude from that result?

σ=5.67*10^{-8}W/㎡ K^4 T1 = 37℃ = 310K T2 = 17℃ = 290K

According to the formula:

$Q_{net_{2-1}}$ = Aσ($T2^4$- $T1^4$)/1/ε1+1/ε2-1 = 1.5*5.67*10^{-8} （310^4-290^4）/1/0.2+1/0.7-1 = 33.8763W

When ε1=ε2=0.1, then:

$Q_{net_{1-2}}$ = Aσ($T1^4$- $T1^4$)/1/ε1+1/ε2-1 = 1.5*5.67*10^{-8} （310^4-290^4）/1/0.1+1/0.1-1 = 9.6789W