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CHEM 6004

Dr. Foley and Dr. Snyder

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**How Cool is That**

1. The spectral region Planck’s Blackbody Law peaks at 300 K is around 5,000 nm, which ranges in the visible infrared region. This correlates to the solar spectrum because the solar peaks also ranges from about 2,000 - 5,000 nm. The actual wavelength value of the peak is 9.659 µm.
2. Ideal properties that cooling materials should have in terms of its emissivity and absorptivity in the spectral region that overlaps with the solar spectrum is how well it radiates, the more that it reflects the light the less energy is being absorbed, and the more the UV lights bounces back into the atmosphere (mostly emissive material)
3. For the Blackbody spectrum at 300K, ideal properties for a cooling material for emissivity and absorptivity would be the opposite. For the black body radiation it is more focused in mid-long IR, meaning that it would be beneficial if the material is highly absorbent and radiates into the atmosphere to create its own thermal energy.
4. The origin of the radiation flowing from the earth’s atmosphere to the structure is that the emissivity of the earth is complimentary to the transitivity of the atmosphere. When that is the case, radiation from the earth will occur back to the atmosphere with a lower absorbance. The sky itself radiates due to the sun’s rays intercepting the atmosphere. The shorter the wavelengths the more easily absorbed by air molecules than light from longer wavelengths. The air molecules (typically oxides or gas) radiate the shorter wavelengths (usually violet or blue light) in different directions.