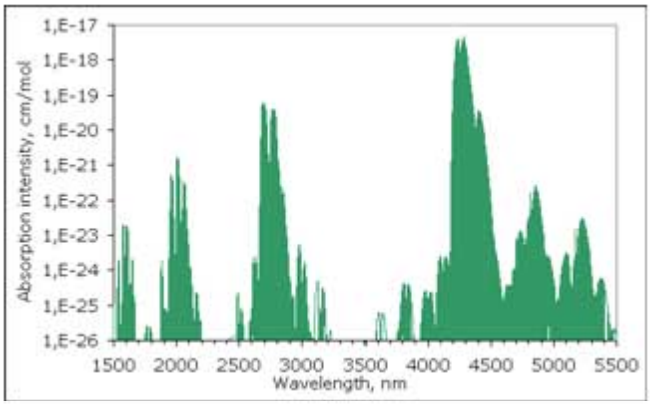
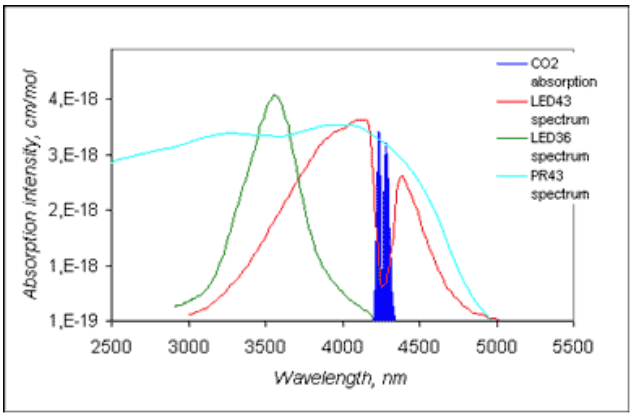
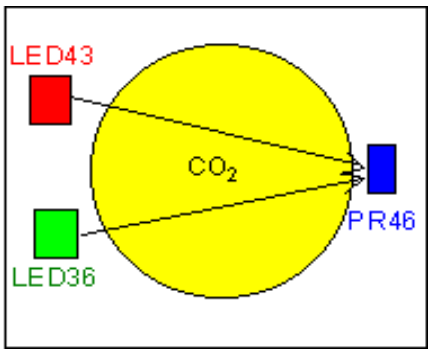
# Carbon Dioxide ($CO_2$) Detection




Carbon Dioxide has very strong absorption band at 4200-4320 nm. Other not so strong absorption bands that can be used for detection are located around 2700 nm and 2000 nm. (The data are taken from HITRAN Catalog).




The strongest absorption band of carbon dioxide is located around 4.27 µm. Maximum of LED43 spectrum is close to this absorption band, so LED43 can be applied as a radiation source for the measuring channel. LED36 can be used as a reference signal since CO2 absorption practically doesn't influence this emitter radiation. Photodiode PD43 or photoresistor PR43 can be used for signals detection. Difference between signals from these two LEDs will be proportional to the carbon dioxide concentration.

Using the second absorption band of CO2 is not appropriate for its detection since there is very strong absorption of water at the same spectral interval.

Third absorption band around 2.30 µm is by three orders weaker than the main absorption at 4.27 µm. But LED23 optical power is about 100 times higher than LED43 power. PD24 detectivity is also much better than PD43 or PR43 detectivity. So, for some applications using LED23 with maximum intensity at 2.3 µm as a measuring signal can be reasonable.

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