### **Photosynthesis:**

Light Reactions Dark Reactions Humans and Bioengineering

## Oxygen problem where O2 level is too high.

### .... Systematics

- Photosynthesis is the formation of carbohydrates using the energy of light.
- The 2 main molecules responsible for Carbon fixation is RuBisco [most dominant protein present] and PEPcase.
- Rubisco with the presence of CO2 can generate 3-PGA which then has to form an aldehyde which is the carboxylation reaction in the Calvin Cycle.
- Rubisco relies on CO2 as a gas molecule and relies on C3 pathway.
- PEP- phosphoenolpyruvate produces no net CO2 production at the end. Relies on the C4 pathway.
- Relies on Carbonate to avoid the oxygen problem.
- 2 different aspects associated with the complexity of these processes (O) the unit aspect and 2) humans and bioengineering.
- The unit aspect has to do with the concentration of C2. CO2 is very good at trapping infrared radiation. Infrared radiation uses and gets reflected back because of the elevated levels of CD2 and horefore the infrared radiation is trapped. All these increase are datato climate change and occur over thousands of years.

# In pact of CO2 elevation on photosynthesis

[Refer to graph]

- The higher the light intensity the higher the carbohydrate formation in the photosynthetic process.
- At higher and higher light intensity it evens out and is saturated. No more Carbohydrates are formed.
- When light is not limiting, no carbohydrates are being formed and remains stagnant. Other factors limit for Example burning of fossil fuels and things like that.
- With elevated levels of CO2, carbon fixation levels increase at a higher rate.
- Temperature affects rate of enzymatic activity. Increase of temperature increase rate of carbon fixation rate.

### **Humans and Bioengineering**

#### **Bioengineering Metabolic Pathways:**

- Formation of phosphoglycolate that doesn't allow for the formation of CO2 fixation.
- Can remove the CO2 from glycolate and will then be rapidly re-fixed into RuBisco.