

Mailvaganam Memorial Oration – 2011

2011 lecture was delivered by

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Artificial Photosynthesis: An environmentally friendly energy solution

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Summary:

Natural photosynthesis combines solar energy with water and carbon dioxide to produce food, energy and oxygen which are essential to sustain life on earth. The stored energy in photosynthetic products is simply recovered by burning with oxygen; however, the emission of the green house gas carbon dioxide to the atmosphere is inevitable in the process. Although acceptable level of carbon dioxide in the atmosphere could be maintained with moderate carbon dioxide emissions, excessive emissions, such as burning fossil fuel, could result in increase of carbon dioxide level in the atmosphere to a catastrophic level. Today we have enough evidences to believe that we are leading towards this catastrophic situation. In the present scenario, for our daily needs and industrial applications, demand on burning fossil fuel can not be ruled out. As a result, it is inevitable that addition of carbon dioxide to the environment, in excess. On the other hand, available resources are depleting very fast. Therefore it is vital that in stead of fossil fuel carbon free energy sources should be developed before it is too late. If the natural photosynthesis route can be replicated by an artificial photosynthetic route combining only water and solar energy without carbon dioxide to produce carbon free energy source, then it will be an ideal environmentally friendly energy solution to one of the most challenging problem of the man kind. In the lecture, fundamental process (physics) involved in natural photosynthesis and the possibility to adapt it to an artificial photosynthetic route to produce carbon free energy source was presented. The requirements, possibilities and future prospects were discussed for producing the carbon free energy carrier via the artificial photosynthesis.