

## ABSTRACT

A photobiological approach to solar energy utilization is possible and long established. Many attempts are being made to use photochemical methods to convert solar energy into usable forms. In this study, we have investigated some systems which may be utilized to convert solar energy into usable forms by Photochemical means.

It was found that cuprous chloride coated cuprous hydroxide behaves as a catalyst in the photoreduction of Nitrogen to Ammonia. The high activity of the catalyst is mainly attributed to the good charge separation and the chemisorbtion of nitrogen.

Hydrogen production from water using solar energy constitutes a recycling and ecologically sound energy system. It was found in the present study that the two systems acetic acid in the presence of  $\text{CuCl}_2$  and D-glucose and starch in aqueous solutions of  $\text{CuCl}_2$  produced a comparatively good hydrogen yield in the laboratory scale. In both these systems, Trichlorocuprate (II) ion acts as the Photocatalyst. A two way photosystem  $\text{MnO}_2/\text{TiO}_2$  in aqueous medium which gave better results has several advantages compared to the earlier systems.

It was also found that  $\text{TiO}_2$  can be successfully employed as a Photocatalyst in water purification systems. The possibility of using  $\text{TiO}_2$  in removing Methyl Violet dye present as a contaminant in water and the conversion of nitrite ions to a less harmful nitrate ions in water were studied as model systems.