CONTENTS

				Page
CHAPTER	1	THEORETICA	AL BACKGROUND	1
	1.1	Introduction	n	1
	1.2	Band Theor	ту	3
	1.3	Metals and	Insulators	7
	1.4	Semiconduct	tors	8
		1.4.1	Intrinsic Semiconductors	11
		1.4.2	Impurity Semiconductors	13
	1.5	Photocataly	tic Activity of Semiconductor	15
		particles a	nd Semiconductor-electrolyte	
		interface		
CHAPTER	п	РНОТОСАТА	LYTIC NITROGEN FIXATION	20
	2.1	Introduction	า	20
	2.2	Biological 1	Nitrogen Fixation	21
	2.3	Chemical N	itrogen Fixation	22
	2.4	Photocataly	tic Nitrogen Fixation	23
		2.4.1	Summary of previous work	24
		2.4.2	Mathematical modelling of	26
			Photocatalytic Nitrogen Fixation	
	2.5	Present Stu	ndy	29
		2.5.1	Experimental	29
		2.5.2	Determination of Ammonia	33
			by Indophenol blue method	

		2.5.3	Determination of Nitrates	36
			and Nitrites	
		2.5.4	Preparation of Catalysts	38
			- Cuprous Chloride coated	
			hydrous cuprous oxide	
		2.5.4.1	Results and Discussion	39
		2.5.5	ZnO/Fe and MgO/Fe ³⁺	42
		2.5.5.1	Results and Discussion	45
CHAPTER	ш	PHOTOGENI	ERATION OF HYDROGEN	48
	3.1	Introduction	on .	48
	3.2	Photosynth	esis	49
	3.3	Mechanism	of Photo-reduction	50
		and Photo-	oxidation of water	
	3.4	Summary o	f previous work	55
	3.5	Present St	ud y	56
	3.6	Experiment	al	56
	•	3.6.1	Aqueous solution of CH ₃ COOH	56
			in the presence of CuCl ₂	
		3.6.1.1	Results and Discussion	58
		3.6.2	Sugars and Starch in aqueous	63
			solutions of CuCl ₂	
		3.6.2.1	Results and Discussion	63
		3.6.3	$\mathrm{MnO}_{2}/\mathrm{TiO}_{2}$ in aqueous medium	68

	3.6.3.1 Results and Discussion	69
	3.6.4 Other systems studied	75
CHAPTER IV	PHOTOOXIDATION OF CONTAMINANTS IN	
	WATER USING SEMICONDUCTOR	
	PHOTOCATALYSTS	
4.1	Introduction	76
4.2	TiO ₂ catalysed photo-oxidation	77
	of Methyl Violet	
	4.2.1 Experimental	78
	4.2.1.1 Results & Discussion	81
4.3	Photocatalytic oxidation of	
	Nitrite to Nitrate	88
	4.3.1 Experimental	89
	4.3.1.1 Results & Discussion	89
REFERENCES		97
LIST OF PUBLIC	ATIONS	108
(Based on the s	study)	