

(HPPLT)

Adsorption Characteristics of Silver onto TiO₂(HPPLT)

150

(HPPLT) UV

		UV				
AgNO ₃	2x10 ⁻⁴ M	HPPLT	가	0.2g/AgNO ₃	200ml	
가 HPPLT	Ag					
1	HPPLT	(g) Ag	0.003g	Ag	,	
AgNO ₃	2x10 ⁻⁴ M	10 ⁻² M	HPPLT	가	0.2g/AgNO ₃	200ml
,	HPPLT	(g) Ag	0.02g	,	4	
Ag	0.03g					

Abstract

The characteristics of silver deposition on UV-illuminated TiO₂ prepared by KAERI has been studied. As a basic procedure for the silver recovery in photographic treated waste, UV illumination apparatus was installed for the experiment of photocatalytic deposition of silver on HPPLT. In case of 0.2g HPPLT in 200ml of 2x10⁻⁴M AgNO₃, the result of illumination showed that N₂ purge has little effect on the adsorption of Ag on HPPLT. With the same experimental conditions, Ag⁺ concentration was decreased to yield about 0.003g Ag/g HPPLT during 1 hour under dark condition, while photocatalytic reaction was not observed in the sunlight exposure. Two experiments were carried out; 0.2g HPPLT in 200ml of 2x10⁻⁴M and 10⁻²M AgNO₃. The former resulted adsorption amount of 0.02g Ag/g HPPLT, though the latter 0.03g Ag/g HPPLT.

1.

가

가

가

가

가

가

가

가

가

가

TiO₂

n- band gap

(electron-hole pair)

(hydroxyl group)

(radical)

가

가

가

가 가

[1]

TiO₂(HPPLT ; Homogeneous Precipitation Process at room or Low Temperature)

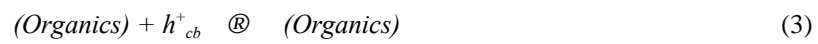
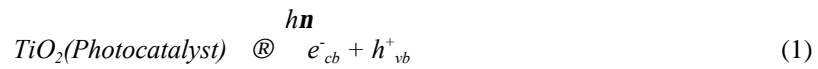
HPPLT

2.

Fujishima Honda[1] 1972 TiO₂ TiO₂ , [2-5]. 가 , 가 UV-TiO₂ [6,7]. band gap (TiO₂ anatase 3.2eV) TiO₂ n- (390nm) 가 가 .

가 가 , (hydroxyl ion)

가 가 가 .



TiO₂ 3가 . (brookite) , 가 가 band gap 가 3.02eV 가 413nm . (3.23eV) band gap 가 , TiO₂ (anatase) 가 가 가 3.23eV UV 388nm . TiO₂가 388nm . HPPLT 1 가 10 30nm P- 25(Degussa, Germany) 20 50nm . 1 P-25

P-25 30 100m²/g 150m²/g [1]. HPPLT가

Ag

3.

Ag AgNO₃(GR, Junsei) Ag
(1000ppm, Junsei) TiO₂

HPPLT

3 Oriel 66921(Oriel Instruments, USA, Lamp Power
400 1000W) 40cm

250Mℓ PYREX

가

inlet outlet tube

inlet

outlet tube

bubble flowmeter

UV

UV

UV

800W

Ag

glass syringe

2cc

, 0.2μm PVDF

Ag

(Perkin Elmer 5100 PC)

3

4.

가

[9]

가

가

가 가

가

AgNO₃

2x10⁻⁴M

HPPLT

가

0.2g/AgNO₃

200ml

UV

2 4 . 가 가 2
 0 가 Ag 가
 21ppm Ag Ag
 2 20 ppm Ag
 가 HPPLT Ag
 5 AgNO₃ 2x10⁻⁴M HPPLT 가 0.2g/AgNO₃ 200ml
 UV , HPPLT HPPLT
 . HPPLT 가 AgNO₃ HPPLT가
 . 6 1 21ppm 18ppm
 Ag , 5 Ag 가
 6 HPPLT (g) Ag 0.003g
 .
 가 가
 5 6
 6 AgNO₃ 2x10⁻⁴M 10⁻²M HPPLT 가
 0.2g/AgNO₃ 200ml HPPLT HPPLT (g) Ag
 (g) 2x10⁻⁴M HPPLT (g) Ag 0.02g , 10⁻²M
 4 Ag 0.03g
 가 Min Huang[10]
 P-25(Degussa) TiO₂ 3 Ag
 . 7 TEM HPPLT Ag
 가 HPPLT Ag
 가 Ag
 HPPLT HPPLT

5.

TiO₂(HPPLT)

HPPLT

AgNO₃ 2x10⁻⁴M HPPLT 가 0.2g/AgNO₃ 200ml

UV 2

21ppm Ag Ag

2

20 ppm Ag 가 HPPLT Ag

AgNO₃ 2x10⁻⁴M HPPLT 가 0.2g/AgNO₃ 200ml UV

HPPLT

6 1 HPPLT (g) Ag 0.003g

Ag , 5 Ag 가

AgNO₃ 2x10⁻⁴M 10⁻²M HPPLT 가 0.2g/AgNO₃ 200ml

HPPLT 2x10⁻⁴M HPPLT (g) Ag

0.02g , 10⁻²M 4 Ag 0.03g

가 . HPPLT

(g) Ag 0.03g P-25(Degussa) TiO₂ 3

Ag . HPPLT

Ag , HPPLT Ag

가 Ag

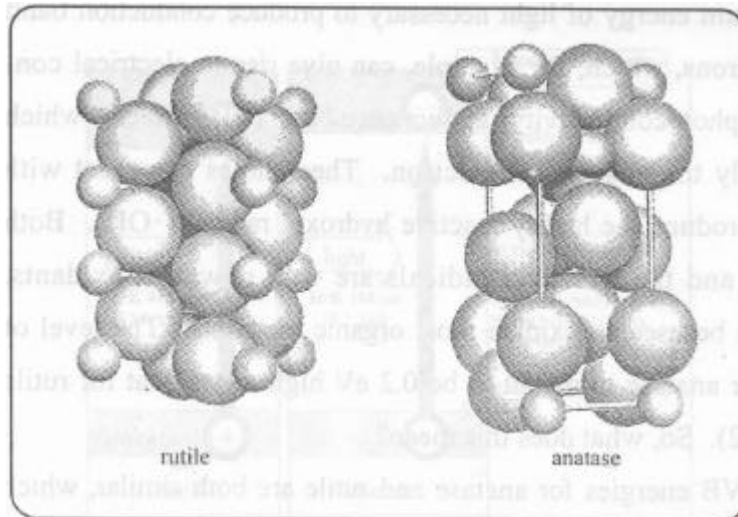
HPPLT HPPLT

* : 21

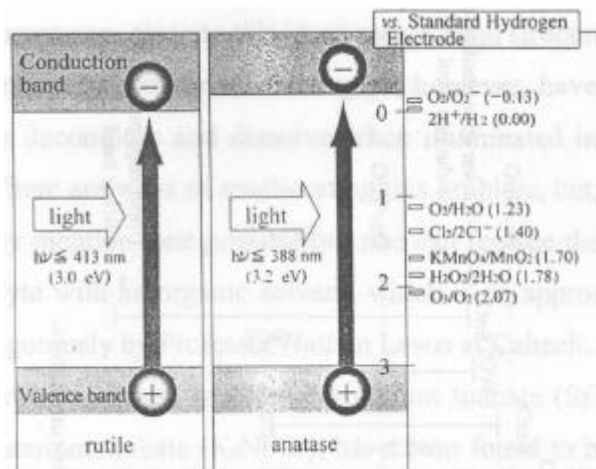
[1] , , , , , , , , “ : TIO2 ” ,

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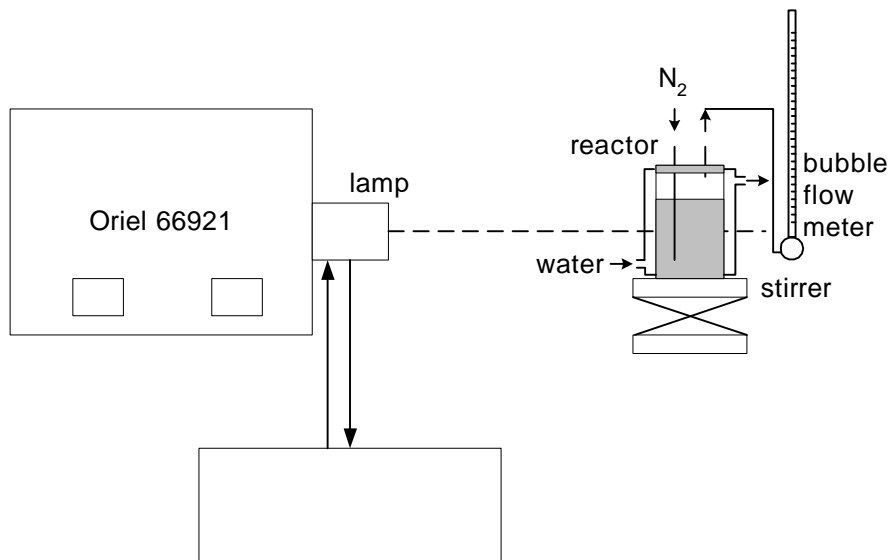
1. TiO₂ anatase rutile



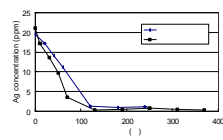
1. TiO₂



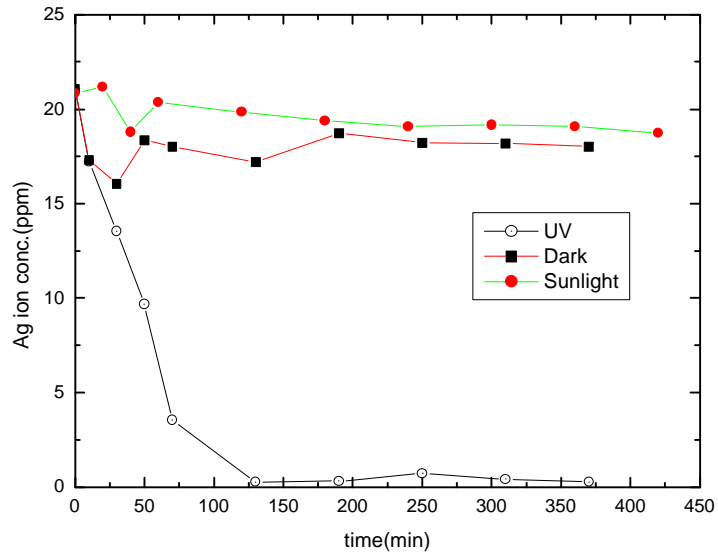
2. TiO₂



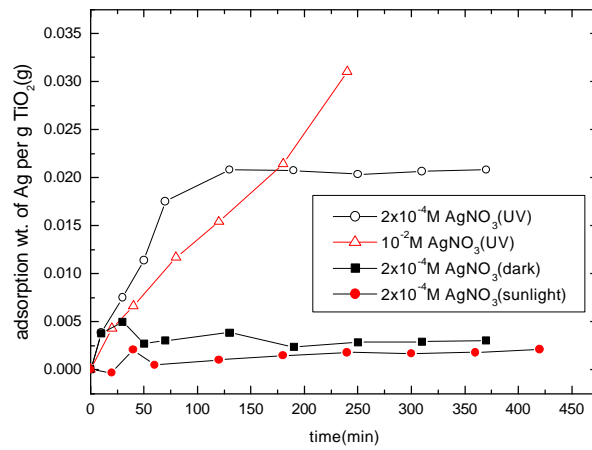
3.



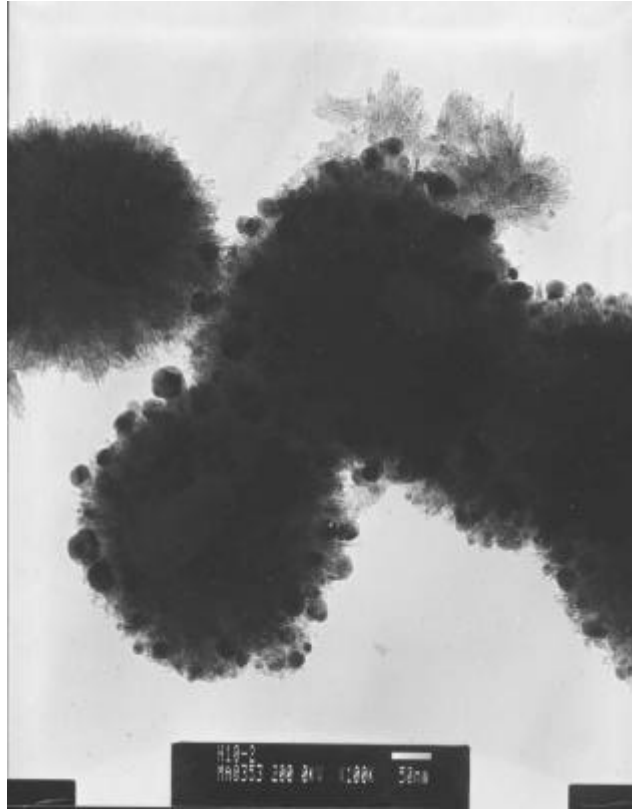
4. $2 \times 10^{-4} M AgNO_3$ 200mL HPPLT
HPPLT 0.2g



5. 2×10^{-4} M AgNO_3 200M \emptyset HPPLT 0.2g



6. HPPLT HPPLT Ag



7. 10^{-2} M AgNO₃ 200Mℓ HPPLT 0.2g 4
Ag/TiO₂ TEM