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2003 03 13

(30) 10142635.6 2001 08 31 (DE)

(71) -67056 - - 38

(72) ,
68159 12 7
,
67051 - - 41
,
67459 - 2
,
67343 4
,
67269 - - 12
,
64683 - . 1
,
67269 14
,
67227 - - 4

(74)

:

(54) (I P D A , 3 - - 3 , 5 , 5 -)

50 200

50 300

0.03 %
3- -3,5,5-

(

, IPN), NH₃ H₂ / 가 70/30 3- -3,5,5-
 (, IPDA) .
 Li, Na, K, Rb Cs . Na .
 / () 0.03
 %
 IPN, 3- -3,5,5- , , IPDN, 3- -3,5,5-
 , ,
 0.03 %
 3- -3,5,5- (, IPN), H₂ NH₃ /
 70/30 3- -3,5,5- (, IPDA)
 .
 IPDA (IPDI)
 IPDA , IP
 N . -IPDA -IPDA . DE-A 42 11 454 2가 가 40%
 , 가 60% IPDA 가 ,
 가 (pot life) 가 (70%) IPDA .
 IPDA / 75/25 .
 /
 DE-A 43 43 890 IPN IPDA 3 8 MPa,
 40 150 , 90 130 Co () Ru가
 IPN, . Ru C₁-C₃ , / (IPDA 81%), Co
 60/40 84/16 / (IPDA 87%). Ru Co
 Ru IPDA IPDA / Ru
 DE-A 43 43 891 Co, Ni (suspended-bed)
 (fixed-bed) 150 3 20 MPa IPN
 , IPDA . IPDA 91.9% /
 80/20 .
 EP-A 0 926 130 VIII ()
 . / IPDA 90% 70/30 . 2- .

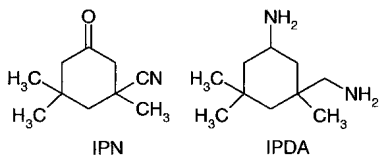
EP-B 0 729 937 2 , , ()
 . NaOH 2
 1,3,3- -6- [3.2.1]

EP-A 0 742 045 55 98 % , 0.2 15 % , 0.2 15
 % , 0.05 5 % , 가 0.1 3 % , 60 150 0.13 1 %
 () IPDA / 300 IPN

IPDA () , HCN ,
 ()

(IPDA)

50 200 50 300 0.03 %
 (IPN), NH₃ H₂ / 가 70/30 3- 3-3,5,5-
 (IPDA) 80 130 100 250 , 200 25
 0 60 160 ,



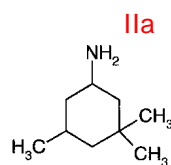
Li, Na, K, Rb Cs

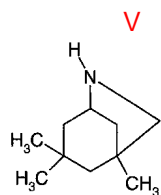
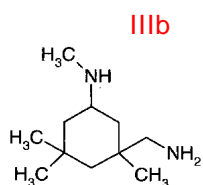
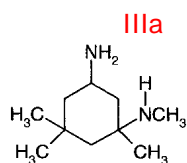
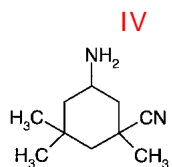
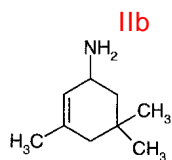
Na

IPDA

IPDA

10 % , 7 % , 5 % . HCN
 (Ila I Ib). (IIIa IIIb) 가 IPDA IPDA
 -6- [3.2.1] (V)가 (IV) IPDA 1,3,3-
 IPDA





	/	70/30	,	73/27	,	75/25
	/	-IPDA	,	-IPDA	,	(GC)
IPDA		90%	,	93%	,	95%
99%	,	99.3%	,	99.7%	,	GC
98%	,					
IPN	IPDA	3-	-3,5,5-	-	(I)	
		20	150	30	130	50
50	300	100	250	200	250	100
	1	2	()	.	

b)

a) 가 2 3 10000 ,
 4.5 100 .
 60 100 50 300 , 100 250 .
 0.05 2 kg[kg/l · h] 1 l 1 (l) 0.01 5 kg, 0.02 2.5 kg,
 3 5 500 , 10 400 , . 3- -3,5,5- (l) 1 NH
 NH₃ 가 NH₃ 가 NH₃ . NH₃ . IPN

a) ,
 (fixed catalyst bed) .
 (IV) , IPDA
 c) .
 3 b) 110 160 50
 300 , b) 100 250 . c) b)
 b) .
 c) , c) b) 20 40% .
 . IPDA
 IPN IPDA
 , , , , , , 0.03 % , , ,
 . 1 0.03 %
 .
 0.03 %
 0.01 10 % , 0.05 5 % , 0.5 3 %
 , Ru, Ir, Pd, Pt () Ni .
 85 95 % , 0.2 55 98 % , 0.5 75 95 % , 1
 6 % , 0.2 15 % , 2 10 % , 3 8 % ,
 0.03 % 가 .
 , () , 0.01 10 % , 0.05
 1 , 0.5 3 % 가 .
 5 % , 0.015 % ,
 0.01 % , 0.015 % , 0.01 % ,
 0.03 % , 0.03 %
 . Na 0.003 % .

a), b) c) 3 , b) c) 2가 1가
 0.03 %

Co, Ru, Ni, Fe, Rh, Pd, Os, Ir, Pt Cu 1 0.03 %

i) 가 가 , , 1 1 ()

ii) i)

iii a) 50 200 , ,

iii b) 600 , 가 가 100

iv) iii a) iii b) () () 가 300 1000 ,

v) iv)

vi) H₂/N₂ H₂/N₂

vii) 20 60 , 가

35 , 20 30 vi) 0.03 % 15

i)

90 , 40 80 , 1 () () 30
 Ir, Pt Cu , 45 55 Co, Ru, Ni, Fe, Rh, Pd, Os, 1
) 가 1 () pH
 5.5 9.0, 6.0 8.0, 6.2 6.8 , pH
 , 5 , 2 , 1.5 , Co Ru pH
 , Co ()

가 , ()
 가 iii b), iv) () vii)

ii)

i) , ,

iiia)

50 200

iiib)

iiia)

, () 100 600

(iiib)) , () 가

iv)

iiia)

iiib) 500 600 1 300 1000 , 400 800 ,

() 가

v)

950 1 70 200 , 90 150 , 100 130
300 1000 , 700 1000 , 800

vi)

4 8 , 2 10 ,
2 24 , 30 70%, 40 60% H₂ 가
280 5 15 200 400 , 250 350
320

vii)

20 50 , 20 40 가 가 60 , 20 60 ,
가 100% 가

200 m² /g, 12 m² /g , 12 500 m² /g, 15
0 cm³ /g, 0.11 18 100 m² /g 0.10 cm³ /g , 0.10 1.0
0.40 cm³ /g, 0.12 0.20 cm³ /g

% Ru/Co Ru 0.01 10 % , 0.1 5 % , 0.5 2
iiib), iv) () vi) 가 Co Ru

active catalyst) / IPN IPDA 0.03 % 0.03 (all-a) 0.03 % IPN

1:

Na Co

10 % Na, 0.55 % Co 0.45 % H₃PO₄

1 () 0.12 cm³/g

16 m²/g

[1]

Co(%)	76	87.9
Mn(%)	4.2	6.6
P(%)	1.8	5.5
Na(%)	<0.01	<0.01
	100 %	

1

EP-A 0 742 045

Na

2: IPDA

IPN IPDA 3 250 Na () Na
 2 / 280 가 .12
 (130 ml/h), (600 g/h) 300 l/h -Al₂O₃ 1 ()
 , 200 ml 80-100 90 . 3(
) 130

2가

Na Co (1)	Na ()
92.9	92.5

/	68.7	75.8
HCN (IIa IIB)	4.6	1.5
(IIIa IIIb)	0.7	0.1
(V)	0.4	2.6
(IV)	0.2	0.1

가 . Na (IIa, IIb, IIIa, IIIb IV) / Na (V)

(57)

1.

50 200 50 300 0.03 %
 , IPN), NH₃ H₂ 3- -3,5,5- ()
 (, IPDA) / 가 70/30 3- -3,5,5-

2.

1 , 2 .
 A) , IPN, NH₃ H₂ 20 150 50 300
 B) A) 60 100 50 300
 , A) B) 2 .

3.

1 , 3 , .
 a) IPN , 20 150 50 300 1
 3- -3,5,5- (I)
 b) a) 2 60 10
 0 50 300
 c) b) 3 110 1
 60 50 300

4.

3 , a) 30 130 () 100 250 .

5.

3 4 , b) () c) 100 250 .

6.

1 5 0.015 % , 0.01 % .

