6 O 2 +

. T

ΔE_b

ΔE_b, ΔH_f

T E . (3)

. F

O,

$$+ \quad = \Delta H_f(\quad); \tag{4}$$

ΔH_f

2 . I

G ,

N 2 2 , 2 3, G N,

2 4 *do not* ,

$$_i \leq 0 \quad (i = \quad ; \quad ; \quad); \tag{5}$$

$$2 \quad + 3 \quad \leq \Delta H_f(\quad _2 \quad _3); \tag{6}$$

$$+ \quad _N \quad \leq \Delta H_f(\quad _N \quad); \tag{7}$$

$$+ 2 \quad + 4 \quad \leq \Delta H_f(\quad _2 \quad _4): \tag{8}$$

T −3:61 (− 3:6), −11:07 (− 10:), −16:24 O, 2 3, 2 4, . T

A N 2

(...) *n-type doping with Ga and N_2 source.* F... 1(...)
... N_2 ... G... f... ($\Delta H_f < 0$)
... N-... N_4 ... N_3 ... *n-*
..., ... G... N_4 ... G... N_3 ...
... *p-* ... f... ($\Delta H_f > 0$)
... T... I...
... fN-... $_4$ ... f... ... f...
ΔE_b

, f , f N- 4 O
f 4 G -N 12 G -O
16 -O . O , '
G N 4 O 4 G -N
12 -N , 16 -O . S
(E , E ,
E) ΔE_b '
(T I), f
f f
20

$$\Delta E_b(\ ;\ _F) = N^{(\ )}_{\ } E_{\ } + N^{(\ )}_{\ } E_{\ } + N^{(\ )}_{\ } E_{\ } ; \tag{9}$$

N^( ) f -