

Densification and Grain Growth of UO₂ Pellet by Microwave Sintering

150

가 2.45GHz
UO₂
96%TD

가
ADU-UO₂
5μm

가 1600 1
가

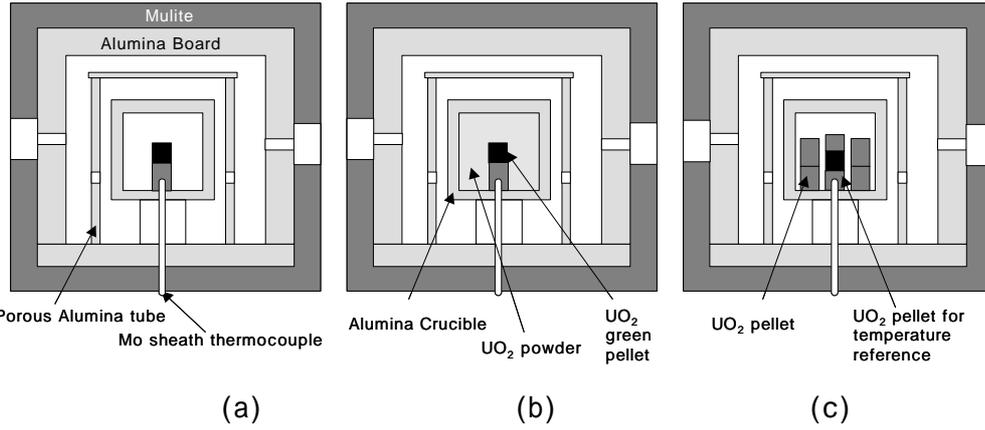
Abstract

Microwave sintering process of UO₂ pellets was studied using a multi-mode type cubic applicator, and a magnetron which generates maximum output of 10kW and operates at a frequency of 2.45GHz. The densification and grain growth behaviors of UO₂ green pellets were investigated to find out sintering variables such as sintering temperature and time during the microwave sintering. The results showed that microwave processing enhanced the densification and grain growth process. The sound sintered pellet having more than 95% theoretical density and 5μm average grain size can be obtained by 1hour holding at 1600 in H₂ atmosphere. The effects of heating rate and thermal shielding on sintering process were also investigated.

1.

UO₂ 1700
가
가 가 UO₂

Powder pellet 가 .
 UO₂
 PID control
 100cc



1. UO₂

1

	()	(hrs)	(/min)
MT1	1600	1	7(~ 1550), 3(1550 ~)
MT2	1650	1	7(~ 1550), 3(1550 ~)
MT3	1700	1	7(~ 1550), 3(1550 ~)
MT4	1750	1	7(~ 1550), 3(1550 ~)
MD1	1700	0	7(~ 1550), 3(1550 ~)
MD2	1700	1	7(~ 1550), 3(1550 ~)
MD4	1700	2	7(~ 1550), 3(1550 ~)
MD4	1700	4	7(~ 1550), 3(1550 ~)
RH1	1700	4	:30
RH2	1700	4	:20

3.

3.1

2 1(a) 1700 1 가

가

1 (b) micro

1650 1600 4 3 pore

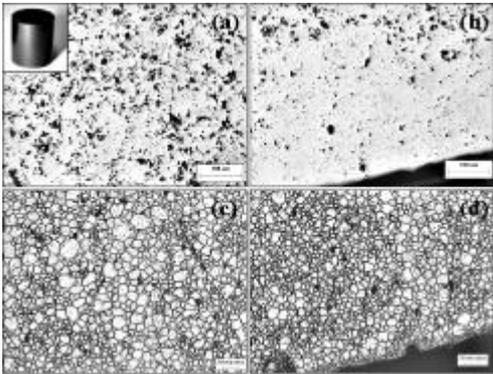
가 hyperstoichiometric O/U

O/U 가 가

UO₂ UO₂ 가

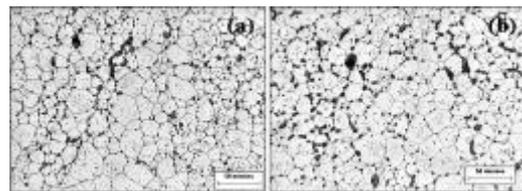
가 1(b) 가

1(c) 가



2. 1(a)
1700 1

(a) (b)
(c) (d)



3. 1(b)

(a) 1600 4
(b) 1650 0

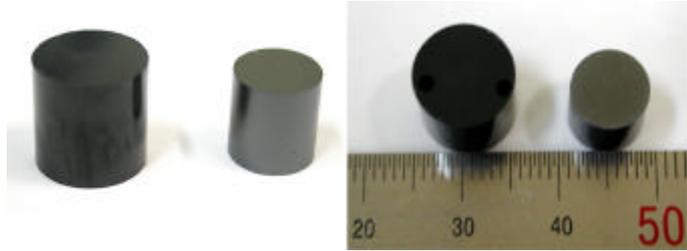
3.2.

4

1(c)

가

1700 4
가



4. ()

.

(가)

5 6

1 가

가

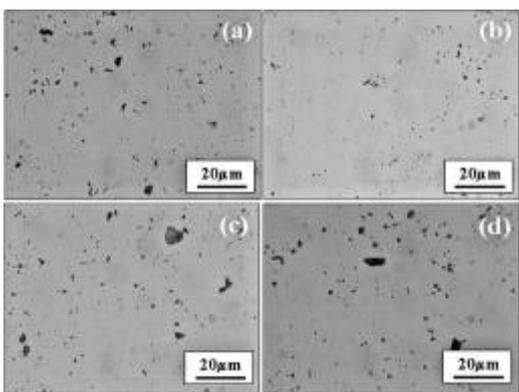
가 가

7

가 가

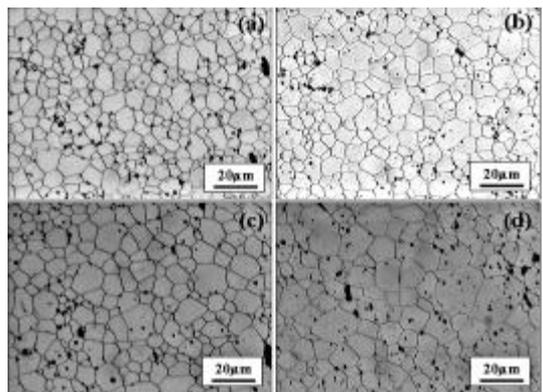
가 5.2μm 8.1μm 96.4%TD 97.1%TD
가

가



5.

(a) MT1 (b) MT2 (c) MT3 (d) MT4



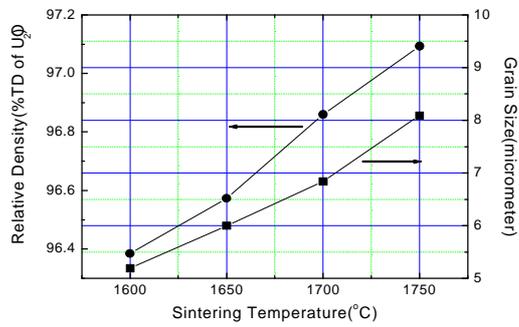
6.

(a) MT1 (b) MT2 (c) MT3 (d) MT4

()

8 9

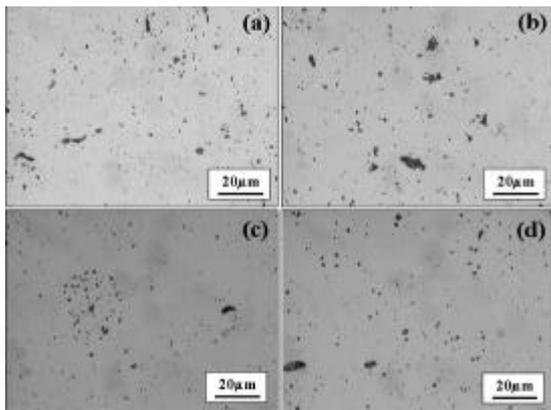
1700 가



7.

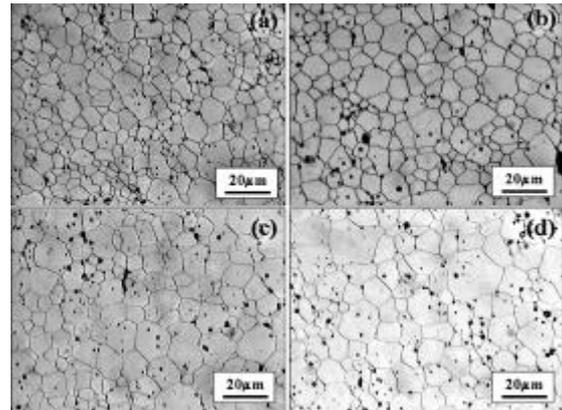
가

가 가 가 가
 0.5%TD 가
 5.7μm 8.2μm 가
 가가



8. 1700

(a) MD1 (b) MD2 (c) MD3 (d) MD4



9. 1700

(a) MD1 (b) MD2 (c) MD3 (d) MD4

()

11

가

12

가

가

가

가

가

가

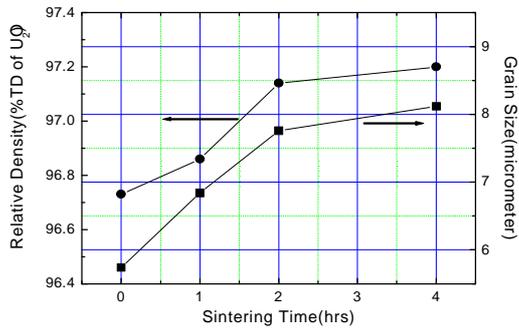
가

가

가

가

가



가

10.



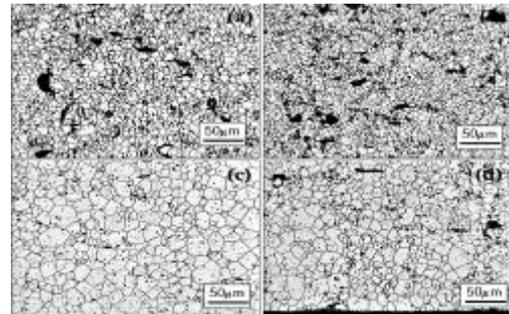
(a)

(b)

11.

(a) RH1

(b) RH2



12.

(a) RH1

(2) RH2

(c) RH1

(d) RH2

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