2000

U-10wt.%Mo

Effect of Powdering Method on the Thermal Compatibility of U-10wt.%Mo Alloy Dispersed in Aluminum

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ABSTRACT

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The interaction between atomized U-10wt.%Mo and aluminum in dispersion fuel samples has been characterized and compared with that of comminuted U-10wt.%Mo. Fuel samples with atomized powder showed a thinner reaction layer thickness and a smaller volume increase compared to those with the comminuted powder. The possible reasons for this seem to be as follows; 1) the comminuted powder particles have distinctive aluminum penetration paths in the form of cracks and deformation zones that originated from the comminution process, 2) the smaller specific surface area of the atomized spherical powder compared to the irregular comminuted powder translating in a smaller U-10wt.%Mo - Al interface area for the former affecting what appears to be a diffusion-controlled interaction process.

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U-A1 DOE(The Department of Energy) 1978 RERTR (Reduced Enrichment Research and Test Reactor) program 90% U - A1 . 가 uranium - silicide (U_3Si_2, U_3Si) [1-5]. , uranium - silicide 가 Al U_3Si_2 , 5 g-U cm⁻³ loading 90% uranium - silicide RHF . Orphee, BR - 2 , U-loading 8 9 g-U/ cm^3 가 1990 U-Mo [6]. - U 가 U-Mo , ingot - U , - U 1980 - U () 가 [7-9]. , ANL . U-10wt.%Mo U - 10wt.%Mo , U-10wt.%Mo 65 1 U - 10% M o $U_{\,3}S\,i_2$ 70at.% . [10]. U-Mo U-10wt.%Mo 2. U-10wt.%Mo , - U ingot 900 100 , chipping pulverization , - U 가 [7-9].

6.5 mm U-10wt.%Mo 25 mm , 500 . pyrex tube sealing .

[10].

1)

500	A1 - 30vol%U-10wt%M	С					
1			가	가			
	U-10wt.%Mo - Al		uranium - alu	ıminide			
,	$Y = [K_0 exp(-Q^{th}/RT)t]^{1/2}$				Y		, Q^{th}
uran	ium - aluminide		, Ko		, t	(), T	
	R .	500	20				
U - 10wt	.% M o	,			2		가
			,				

Kirkendall effect

가 [11].

	[12].	, chipping pulverization	
	force	가 .	
가	(phase interface)	U - 10wt.%Mo	가

2)

500	10	10 30v ol% U - 10w t.% M o							
	1	1- (a)					가		
	•								
		가							
	가	'kernel-like	structure '	가					
가			island					,	
U - 10wt.%Mo						,			
			. U - 10	wt.%Mo					
island				가			. 500	20	
30v ol% U - 10w t.% M o									
1-(b)		. 20				Al		,	
			island 7	ነት					
		,	가	,		10wt.%Mo			
			island				island		
			uraniui	n - alumini	de				
500	10			30v	ol%U	- 10wt.% Mo			
		2-(a)					1/2	2	
		. ,	가						
,		uranium - aluminide							
	island	가 .		30v ol% U	- 10wf	t.%Mo	500	20	

2- (b) . 20

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(hr)	(µm)	(%)
10	4.0	3.4
20	5.2	6.7
10	5.9	7.2
20	8.0	14.8









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