Quarterly Management Report

WBS Element	Project Title	Contract Number	Contract Start	Contract End
UT-2(A)	Study of Microstructure and Mechanical Behavior of TiAl Alloys.	11X-SP173V	09/15/93	03/15/04

Performer Name and Address	Principal Investigator(s)
The University of Tennessee Department of Materials Science and Engineering Knoxville, TN 37996-2200	P. K. Liaw

BUDGET AND COST REPORT

Prior Year Funds [$K]	1
Total Current Year Commitment $K]	78
Projected Current Year Costs [$K]	78

	O	N	D	J	F	M	A	M	J	J	A	S
Planned Costs	68	70	72	76	78	79	55	57	59	61	64	66
Actual Costs	70	71	72				53	55	58	61	64	69
Variance	(2)	(1)	0	76	78	79	2	2	1	0	0	(3)

MILESTONE REPORT

Milestone Designation	Milestone Description	Due Date	Revised Due Date	Completion Date
UT-2(A)-1	Conduct a review of reference papers on Ti-Al-Nb.	08/15/03		08/15/03
UT-2(A)-2	Design the possible compositions of Ti-Al-Nb-M-B alloys.	08/31/03		08/31/03
UT-2(A)-3	Investigate microstructures on heat-treated Ti-Al-Nb-M-B alloys.	04/30/04		
UT-2(A)-4	Perform mechanical and corrosion studies on Ti-Al-Nb-M-B alloys at the University of Tennessee and Oak Ridge National Laboratory.	08/31/04		
UT-2(A)-5	Understand the relationship between the mechanical behavior and microstructure.	10/31/04		
UT-2(A)-6	Develop theoretical models to predict mechanical behavior.	12/31/04		

TECHNICAL HIGHLIGHTS

Great attentions have been drawn on Ti-Al-based alloys for their properties, such as, low density, excellent high temperature strength, and good oxidation resistance. Our research interest focuses on Ti--44at%Al--8.5Nb--1.5at%W--0.05at%B. Since Nb can increase the oxidation resistance of the material, high Nb containing Ti-Al alloys exhibit very high strengths at both room and high temperatures; both Nb and W are effective beta phase stabilizers; and boron additions in lamellar Ti-Al-alloys have a significant effect on room-temperature tensile ductility. Ti-Al-based alloys with fully lamellar microstructures have the most balanced properties at both room and elevated temperatures. Lamellar microstructures show excellent strength and fracture toughness. The temperatures associated with different phase transformations have been determined. The phase diagram and heat-treat schedule will be used for heat-treating our materials to produce desirable microstructures.

ISSUES

Report Prepared By	Date
P. K. Liaw	01/29/04