Quarterly Management Report

WBS Element	Project Title	Contract Number	Contract Start	Contract End
ORNL-2D	Multi-Phase High-Temperature Alloys			

Performer Name and Address	Principal Investigator(s)
ORNL	M.P. Brady and C.T. Liu

BUDGET AND COST REPORT

Prior Year Funds [$K]	11
Total Current Year Commitment $K]	110
Projected Current Year Costs [$K]	121

	O	N	D	J	F	M	A	M	J	J	A	S
Planned Costs	5	11	23	34	45	55	70	85	95	100	110	121
Actual Costs	7	12	19									
Variance	(2)	(1)	5	34	45	55	70	85	95	100	110	121

MILESTONE REPORT

Milestone Designation	Milestone Description	Due Date	Revised Due Date	Completion Date
2D/4A 1	3. Assess potential for intermetallic strengthened ferritic and austenitic alloys for improved elevated-temperature strength in applications	05/30/04		

TECHNICAL HIGHLIGHTS

We have initiated an effort on the development of new high-temperature alloys based on TiAl with Nb additions. According to the phase relationship published recently, Nb additions have the beneficial effect of increasing the melting point and improving the oxidation resistance of titanium aluminides. The TiAl+Nb alloys have the potential to be used at temperatures from 800 to 1000C in oxidizing environments. Two new alloys were prepared during this quarter, and their compositions are given below in atomic percent:

TIA-50: Ti-44Al-8.5Nb-1.5W-0.12B, and
TIA-51: Ti-44Al-8.5Nb-1.5W-0.3Y-0.12B.

The addition of W and Y was added for further improvement in oxidation resistance and B was for controlling grain size and the interfacial cohesive strength. Our initial differential scanning calorimetry (DSC) measurements indicate that TIA-50 was melted around 1500C, which is more 100C higher than that of currently titanium aluminide alloys. Microstructural examination shows the formation of fine lamellar structures in these alloys.

Initial planning has also been made for design of intermetallic strengthened ferritic and austenitic alloys. Both these alloys and the aforementioned TiAl alloys are to be screened for potential to meet improved high-temperature strength and oxidation/corrosion resistance goals relevant to advanced fossil energy conversion and combustion system hot components.

ISSUES

none

Report Prepared By	Date
MP Brady	01/30/04