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UNITED NATIONS INDUSTRIAL ORGANIZATION

PROJECT PROPOSAL

PART A - BASIC DATA

COUNTRY	:	Korea/Hungary
PROJECT NUMBER	:	
PROJECT TITLE	:	"Modification of Matrices for Toughened Composites" Twinning Agreement between the Korea Institute of Science and Technology (KIST), Seoul, Korea and the Central Research Institute for Chemistry, (CRIC), Budapest, Hungary under the auspices of UNIDO
SCHEDULED START	:	April, 1990
SCHEDULED COMPLETION	:	March, 1991
ORIGIN AND DATE OF OFFICIAL REQUEST	:	KAIST, Korea/CRIC, Hungary
GOVERNMENT COUNTER-PART AGENCIES	:	
UNIDO CONTRIBUTION	:	US $ 30,000
GOVERNMENT CONTRIBUTION	:	Korea (US $ 40,000/year) and Hungary (US $ 10,000)
CURRENCY REQUIRED FOR		
UNIDO INPUT	:	US $ 30,000
CONVERTIBLE	:	
OTHER	:	
UNIDO SUBSTANTIVE BACK-STOPPING SECTION	:	
PROGRAMME COMPONENT CODE	:	
PROPOSAL SUBMITTED BY	:	KIST and CRIC

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PART B - NARRATIVE

1. Background and Justification

Advanced ceramic composities are a unique class of engineering materials for high performance applications such as cutting tools, wear-resistant parts, engine components, heat exchangers, and hard armors for military vehicles.
SiC-whisker reinforced ceramic composites recently became prominent for structural applications. However, these composites have too much variation dependent on the types of SiC-whisker, particularly on whisker structure and whisker surface condition. These variables control the interface between the whisker and the matrix. The interface of composites is the key to improving composite proes. Unfortunately, this aspect has not been studied much and controlled yet. This study, therefore, is aimed at evaluating microstructure/properties relationships and chemical compatibility in SiC-whisker reinforced ceramic matrix composites.

2. Special Consideration

The major purpose of the project is to lay the basis for establishment of bilateral interest to co-operate on the basis of sharing experience in industrialization and technology and know-how between KIST and CRIC, so that acceleration of the research results could be achieved and the expectation of duplication work could be avoided.

3. Objectives

The objective of this study is to identify and control the interface between the SiC-whisker and the matrix to optimize SiC -whisker reinforced ceramic matrix composites.

- Selection and definition of candidate matrices using thermochemical calculations
- Validation and characterization of the constituent materials
- Establishment of the conditions needed to fabricate the composites
- Determination of preliminary data on the resultant composites regarding the mechanical properties, temperature stability, and environmental resistance
- Establishment of the conditions of SiC-whisker to produce the best composites for structural applications
- Modify fibers surface and control the fiber/matrix interface for toughened ceramic composites

4. Project Outputs

Expected output from this project are as follows:
Better understanding of structure/property relationships in multicomponent polymer systems, development of polymer composites with improved properties for special applications

5. Project Activities

This study shall utilize basic thermodynamic consideraions to predict the best potential matrix for high temperature structural composites. These choices shall then be evaluated in a number of experiments. Finally, recommendations are to be made regarding these systems.

In order to aproach the goal of the project, both institutes on the basis of the time schedule and allowed budget for the project, will exchange research personnel, work together at the research partner's facilities. In addition, joint publications and/or patents can be prepared.

6. Project Input

UNIDO will provide US $ 30,000 for the period April 1990 - March 1991 in convertible currency and equivalent of US $ 50,000 in local, non-convertible currency will be provided by the countries concerned (Korea: US $ 40,000 and Hungary: US $ 10,000).

7. Evaluation Plan

The project will be evaluated during the implementation and upon completion by the NGOs, Business and Industrial Institutions Co-operation Section, and PDES with participation of the representatives of KRICT and CRIC.

8. Envisaged Follow-up

The first phase of this project will end in March 1991. In the light of experience gained during this period, a long-term follow-up project will be considered by the NGOs, Business and industrial Institutions Co-operation Section, and PDES.

PART C - CLEARANCE AND APPROVAL

Cleared by: Date:

Date:

Approved by: Date:

Amount approved Source of Funds:

Convertible Currency:

Other Date PAD requrested:

Annex 1

WORKING PLAN 1990/1991

1.	Project Commencement	Starting Date
	Exchange copies of papers and information	April, 1990
2.	Exchange of Staff	
	Meeting will be held to design the joint research program in CRIC, Hungary	May, 1990
3.	Meeting of experts	
	- in Korea/2 person	November, 1990
	- in Hungary/2 person	May, 1991
	It will be continued every year during the research period.	
4.	Exchange of information	
	Periodic exchange of experimental plans, results, technical publication, and other informations.	Continuously
5.	Seminar	
	Seminar will be held during the periodic expert meeting.	November, 1990 May, 1991

Annex 2

FINANCIAL CONTRIBUTION OF UNIDO
TO WORKING PLAN 1990/191

Expert Component	Starting Date
Round trip tickets for 1 Korean staff to participate on the start-up meeting in CRIC, Hungary	May Ist, 1990
Round trip tickets for 2 experts to participate meeting in Korea/Hungary-Seoul-Hungary	November, Ist 1990
Round trip tickets for 2 experts to participate meeting in Hungary	May, Ist, 1991
Miscellaneous	
GRAND TOTAL	US $ 30,000