



**TOGETHER**  
*for a sustainable future*

## OCCASION

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UNITED NATIONS INDUSTRIAL ORGANIZATION

PROJECT PROPOSAL

PART A - BASIC DATA

COUNTRY : Korea/GDR  
PROJECT NUMBER :  
PROJECT TITLE : "High Modulus/High Strength Fibers"  
Twinning Agreement between Korea  
Institute of Science and Technology,  
(KIST), Seoul, Korea and Dresden  
University of Technology (DUT),  
Dresden, GDR under the auspices  
of UNIDO  
  
SCHEDULED START . March, 1990  
SCHEDULED COMPLETION : Feb., 1991  
ORIGIN AND DATE OF  
OFFICIAL REQUEST : KIST and DUT  
GOVERNMENT COUNTERPART  
AGENCIES :  
UNIDO CONTRIBUTION :  
GOVERNMENT CONTRIBUTION : Korea (US \$ 15,000)/GDR (US \$ 5,000)  
  
CURRENCY REQUIRED FOR  
UNIDO INPUT : US \$ 35,000  
CONVERTIBLE :  
OTHER :  
UNIDO SUBSTANTIVE BACK-  
STOPPING SECTION :  
PROGRAMME COMPONENT CODE :  
PROPOSAL SUBMITTED BY : KIST and DUT  
DATE OF SUBMISSION :

31/2

## PART B - NARRATIVE

### 1. Background and Justification

Development of chemical fibrebased industry and future chemical process improvement are demanding synthesis, characterization and studies on phase behaviour of polymers or polymer mixtures with high modular strength and thermostability. Highly structured polymers based on polyamides and polyimides have been promising to meet this quality.

KIST (Korea) has been studying the relationship between processing conditions and fiber end properties, and has the capacity to produce PE fiber with tensile streugh of 3GPa and tensile modulus of over 100 HPa. They intend to further investigate the effect of annealing process on the properties and surface propoerties of fibers will be systematically carried out.

Dresden University of Technology, on the other hand, investigated the structure formation in forced mixtures of highly incompatible polymers, and conducted studies on concentration fluctuations. Phase behaviours of molecular composites and conditions for structure formation in them would be further investigated.

With these above-mentioned research outputs based upon the common interest to produce the high modulus/high strength fibers, it is expected that both institutes working hand in hand will produce tangible progress in the area of new synthetic polymer of high strength for many useful industrial use.

### 2. Special Consideration

This project will lay the basis for establishment of bilateral co-operation on the basis of sharing experience in industrialization and technology know-how between KIST and Dresden University of Technology.

### 3. Objectives

The main objective of this project is to search for the optimum processing conditions and hence to maximize the end properties of final fibers. Additionally to modify the surface of fibers.

### 4. Project Outputs

It is expected that through implementation of this project, commercial grade of PE fibers, which can find use in the field of high technology industries, to be obtained on laboratory scale.

Approaches to molecular-reinforced composites and structure formation via phase separation in them will also be clarified.

### 5. Project Activities

In this project, structure-property relationships of rigid-chain polymers and on novel blends comprising flexible- and rigid-chain polymers is to be investigated, semi-continuous lab-scale gel-spinning device will be set up and the relation-ship between operating conditions and end properties of fibers will be studied semi-continuously.

In order to facilitate the attainment of the main objective of the project, both institutes, on the basis of the time schedule of the project inputs and all activities, will be involved in following activities:

- Establishment of long and short-term training facilities;
- Exchange of research staff;
- Visit of experts;
- Symposia, colloquia, meetings and exchange of technical publications

#### 6. Project Input

UNIDO will provide US\$ 35,000 for the period March 1990 - Feb., 1991 in convertible currency and equivalent of US\$20,000 in local, non-convertible currency will be provided by the countries concerned (Korea: US\$ 15,000 and G D R : US\$ 5,000 ).

#### 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 K IST and DUT.

#### 8. Envisaged Follow-up

The first phase of this three-year project will end in Feb., 1993. In the light of project output resulted during this phase, the necessity for a long-term follow-up project will be carefully 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 requested:

Annex 1

WORKING PLAN 1990/1991

- | <u>1. Project Commencement</u>  | <u>Starting Date</u>                  |
|---|---------------------------------------|
| Exchange copies of papers and information   | March, 1990                           |
| <u>2. Exchange of Staff</u>   |                                       |
| Meeting will be held to design the joint research programme in KAIST, Seoul, Korea              | April, 1990<br>(continued every year) |
| <u>3. Meeting of experts</u>  |                                       |
| - in GDR/3 persons  | October, 1990                         |
| - In Korea/3 persons  | April, 1991                           |
| It will be continued every year during the research period.                                     |                                       |
| <u>4. Exchange of information</u>   |                                       |
| Periodic exchange of experimental plans, results, technical publication, and other informations | Continuously                          |
| <u>5. Seminar</u>   |                                       |
| Seminar will be held during the periodic expert meeting.  | October, 1990<br>April, 1991          |

Annex 2

FINANCIAL CONTRIBUTION OF UNIDO TO  
WORKING PLAN 1990/1991

<u>Expert Component</u>	<u>Starting date</u>
Round trip ticket for 1 GDR staff to participate on the start- up meeting in Seoul, Korea/Dresden- Seoul-Dresden	April 1st, 1990
Round trip tickets for 3 experts, to participate meeting in Dresden, GDR/Seoul-Dresden-Seoul	October 1st 1990
Round trip tickets for 3 experts to participate meeting in Seoul, Korea/Dresden-Seoul-Dresden	April 1st 1991
<u>Miscellaneous</u>	

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TOTAL

US \$ 35,000



Annex 3

FINANCIAL CONTRIBUTION OF KIST

TO WORKING PLAN 1990/1991

(in Won)

<u>Expert Component</u>	<u>Duration</u>	<u>Cost</u>
Daily substance for 1 GDR staff incharge of the project to visit for annual meeting	1 x 14 days	
Daily substance of 3 GDR exérts tp visit Korea for periodical meeting	3 x 14 days	
<u>Communication Component</u>		
To cover the cost of corres- pondence, telex or fax for ex- change of informations, papers, experimental results.		
<u>Miscellaneous</u>		
:		
Total		10,940,000