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UNITED NATIONS INDUSTRIAL ORGANIZATION

PROJECT PROPOSAL

PART A - BASIC DATA

COUNTRY : Korea/Czechoslovakia

PROJECT NUMBER :

PROJECT TITLE : "Synthesis, Modification and Evaluation of Special Chelating Polymeric Resins":  
Twinning Agreement between the Korea Research Institute of Chemical Technology, (KRICT), Deajeon, Korea and the Institute of Macromolecular Chemistry (IMC), Czechoslovakia.

SCHEDULED START : March, 1990

SCHEDULED COMPLETION : Dec., 1992 with possibility of extension

ORIGIN AND DATE OF OFFICIAL REQUEST : 4th September, 1989

GOVERNMENT COUNTER-PART AGENCIES : KRICT, Korea and IMC, Czechoslovakia

UNIDO CONTRIBUTION : US \$ 43,000

GOVERNMENT CONTRIBUTION : Funded annually from budget supported by both governments

CURRENCY REQUIRED FOR UNIDO INPUT : US \$ 43,000

CONVERTIBLE :

OTHER :

UNIDO SUBSTANTIVE BACKSTOPPING SECTION :

PROGRAMME COMPONENT CODE :

PROPOSAL SUBMITTED BY : IMC and KRICT

DATE OF SUBMISSION :

PART B - NARRATIVE

1. Background and Justification

The main application for chelating resins are based on the high selectivity of the materials for particular ions, and some of the chelating resins have been widely used as polymeric catalysts and reagents in many commercial applications. There are many mining or pollution situations in which the precious or toxic ion is a small part of a mixture of many other ions, and if this ion can be recovered specifically, the energy and material requirements of the process can be reduced dramatically. Their chelating effects are greatly influenced by chelating-forming abilities on the transport and function of metal ions in the environmente.

Recently, new chelating resing containing phosphonyl and amidoxime group on the polymer backbone was prepared by KRICT(Korea), and the results showed that the chelating resings were very available for the adsorption of uranyl ion. These resins are expected to recover uranyl ion from ses water, including selective separation of single metal from mixtures in solution

IMC (Czechoslovak) is interest<sup>d</sup> in the recovery of single metal from mixtures in solution through various chelating resins. In particular, the chelating resins have been given much attention with respect to the recovery of rare metal ions of great value. They have also been employed successfully in application field such as removal of harmful trace metal ions, because of the highly selective adsorptivity for heavy metal ions.

In the light of progress made at both institutes, a joint research program on the synthesis and evaluation of special chelating polymeric resins combining Korea Research Institute of Chemical Technology (KRICT) which represents an industrial research, with

the Institute of Macromolecular Chemistry of the Czechoslovak Academy of Sciences (IMC) representing the fundamental institution, seems to be very ideal. The joint program can be seen as a example of the combination between basic and application research.

## 2. Special Consideration

This project will lay a basis for the establishment of bilateral interests to co-operate, to share experiences and to develop technology between KRICT and IMC. The bilateral character of the suggested project, non-convertible currency inputs of both institutes and the objectives of the project qualify it to be financed from UNIDO.

The practical project theme containing the molecular designs of the chelating resins will be determined by Czechoslovak side.

## 3. Objectives

The main objective of this project can be stated as follows:

- Synthesis of macroporous spherical polymer beads with predetermined properties and reactivity, their functionalization. (Czechoslovak side)
- Modification and evaluation of chelating polymeric resins for selected purposes for recovery and separation of metal ions in solution. (Korean side)
- Application of this project output : Industrial use of developed processes. (Both sides)

## 4. Project Outputs

It is expected that through implementation of this project both institutes will increase their capabilities in order to

become focal points of innovation and technology improvement in their countries. In addition, the project which should be done by the two research institutes, supported by UNIDO, are expected to produce new chelating resins having several uses as follows.

- Waste water treatment
- Recovery of valuable metals from unusual sources
- Separation of single metal from mixtures

#### 5. Project Activities

Currently, KRICT group is active in improving chelating capacities by evaluating new chelating resins with selective ligands and IMC group has made solid progress on controlling pore structure and chemical composition of glycidyl methacrylate copolymers.

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 budget allocated, will exchange researchers, and organize a symposium.

#### 6. Project Input

UNIDO will provide US \$ 43,000 for the period Mar., 1990 - Dec., 1992 in convertible currency and equivalent of US \$ 12,000 in local, non-convertible currency will be provided by the countries concerned (Korea: US \$ 8,346,000 Won and Czechoslovakia: US \$ 48,000 CSK).

#### 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 IMC.

8. Envisaged Follow-up

The first phase of this three-year project will end in July 1992. In the light of research results produced during this phase, a long-term follow-up project will be critically considered by the NGOs, Business and Industrial Institutions Co-operation Section, and PDES.

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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. FINANCIAL CONTRIBUTION OF UNIDO TO THE WORKING

PLAN MAR. 1990/DECEN. 1992

(in US dollars, USD)

Items	Expenditure
<u>Expert Component</u>	
Round trip tickets for 3 Czechoslovak experts to participate on the start-up meeting in Korea Prague-Daejeon-Prague	USD 13,000
Round trip tickets for 3 Korean experts participating in the annual meeting in Czechoslovakia Daejeon-Prague-Daejeon	USD 13,000
<u>Training Component</u>	
Round trip ticket for 1 Korean scientist to be trained in Czechoslovakia	USD 4,000
Round trip ticket for 1 Czechoslovak scientist to be trained in Korea	USD 4,000
<u>Symposium Component</u>	
Round trip ticket for one Czechoslovak participant on the Symposium in Melbourne Prague-Melbourne-Prague	USD 4,000
Round trip ticket for one Korean participant on the Symposium in Melbourne Daejeon-Melbourne-Daejeon	USD 3,000
Symposium fee, daily allowance and accommodation for two participants during 5 days	USD 2,000
<b>Total</b>	<b>USD 43,000</b>

Items	Duration	Starting Date
1. Start-up meeting of both sides experts at KRICT	3 x 8 days	March 1990
2. Consultations of exports will be held according to the needs of the specific problems		
3. Meetings on the management level will be held alternatively in both institutes to evaluate the results and to prepare the plan and budget for the next year The first one will be held in Prague	1 x 8 days	January 1991
4. Training Korean scientist will be trained in the design and synthesis of selective chelating resins in Prague	1 x 2 months	May 1991
Czechoslovak scientist will be trained in the evaluation of the chelating resins in Daejeon	1 x 2 months	April 1992
5. Seminar evaluating the results of the first year co-operation will be held during the management meeting in Prague	2 x 8 days	January 1991
6. Scientific Report on results of the co-operation at the IUPAC meeting in Melbourne by one expert from each side	2 x 5 days	February 1991
7. Exchange of technical publications and samples	continuously	



Annex 23 FINANCIAL CONTRIBUTION OF KOREA TO THE WORKING PLAN  
MARCH 1990/DECEM. 1992

(in Korean won, ₩)

Items	Duration	Expenditure
<u>Expert Component</u>		
Daily subsistence composed from daily allowance and accommodation for 1 Czechoslovak manager and 2 scientists participating in the annual meeting	3 x 8 days	4,341,000 ₩
<u>Training Component</u>		
Daily subsistence composed from daily allowance and accommodation for 1 Czechoslovak scientist	1 x 2 months	3,620,000 ₩
Allocation to cover additional training costs such as local travelling, local symposium fee, etc.		219,000 ₩
Miscellaneous		166,000 ₩
<hr/> Total		8,346,000 ₩

Annex 4. FINANCIAL CONTRIBUTION OF CZECHOSLOVAKIA TO THE  
 WORKING PLAN <sup>MARCH</sup> 1990/DECEM. 1992

(in Czechoslovak crowns, CSK)		
Items	Duration	Expenditure
<u>Expert Component</u>		
Daily subsistence composed from daily allowance and accommodation for 1 Korean manager and 2 scientists participating in the annual meeting	3 x 8 days	12,000CSK
<u>Training Component</u>		
Daily subsistence composed from daily allowance and accommodation for 1 Korea scientist	1 x 2 months	30,000CSK
Allocation to cover additional training costs such as local travelling, local symposium fee, etc.		5,000CSK
Miscellaneous		1,000CSK
<b>Total</b>		<b>48,000CSK</b>