AUGUST 1 • 1974 Vol. 6 No. 8

AUG 1974

SCIENCE BULLETIN

National Science Council
2 Canton Street
Taipei, Republic of China

8 Savants Voted to Join Rank of Academicians

Academia Sinica elected eight *Yuan Shih,* or academicians, at its 11th conference of academicians at Nankang in mid-July.

The eight academicians were elected after the fifth balloting.

They were Dr. Chou Wen-teh, 55, of Chekiang, professor at the University of Illinois, Urbana, Ill, who is noted for his work in hydrodynamics; Dr. Y.S. Chow, 50, of Hupeh, director of the Institute of Mathematics, Academia Sinica; Dr. Chang Po-yi, 54, of Hunan, a biologist, who is known for his research on cancer, Dr. Kuo Tsung-teh, 41, of Taiwan, director of the Institute of Botany, Academia Sinica; Dr. Chang Kuang-chih, 43, of Taiwan, a research fellow at the Institute of History and Philology, Academia Sinica, who is an anthropologist; Yu Ying-shih, 44, of Anhwei, president of New Asia College, Chinese University of Hongkong, who is a historian; Father Maurus Fang, 64, of Chekiang, professor at National Chengich University, a historian; and Chiang Fu-tsung, 76, of Chekiang, director of the National Palace Museum.

Unlike members of the Academie Francaise, the number of *Yuan Shih* is not limited. With the addition of eight more members, the present membership will reach 77. The title of *Yuan Shih* is honorary.

Meanwhile, the academy has set up an American Culture Research Institute to promote research in American culture.

Dr. Chen Chi-lou is appointed head of the new institute.

The institute has been established at the recommendation of the Commission on Sino-American Science Cooperation to replace the former American Research Center with the approval of the government.

The institute is located at the site of the American Research Center at Nankang in suburban Taipei.

The scope of research to be taken up by the newly founded institute will include studies on recent developments in U.S. politics, economics, social trends, foreign relations, law, literature and history. In addition, emphasis will be placed on promoting cooperation between Chinese and American academic institutes.

The institute at presnet houses some 37,000 newly published American books.

Dr. Chen, the first director of the institute, 51, who is a native of Taiwan, earned his doctorate in sociology at National Tokyo University. He is at present on the faculty of National Taiwan University.

'Chinese' Computer Said Ready

An American manufacturer of phototypesetting computers has developed a device capable of processing Chinese characters, according to an American industrial technical representative.

The International Photon Corporation in Wilmington, Mass, will show the computer in Hongkong at the end of this year, James C. Toedtman, president of Inter/Com, Inc., said.

"The Photon will also exhibit the machine in Taipei next January," he added.

The machine is capable of processing 5,040 Chinese characters on its two discs, Toedtman said. One major advantage of the machine is its fast speed in setting characters, he noted. It can set some 3,600 Chinese characters in an hour, almost four times faster than handsetting, Toedtman said.

Toedtman was a representative of the American printing and graphic arts industry at a catalog show at the U.S. Trade Center in Taipei. The four-day show was held in late July.

Members of Academia Sinica pose for a group picture after concluding the 11th Conference of Academicians at Nankang, Taipei in mid-July. The majority of the 1974 conference came from the United States. They elected eight new academicians at the meeting.

Grafting of Vinyl Copolymers— An Application of Living Polymer

(Continued from last issue)

Hughes (23) compared the characteristic of the graft copolymer, random copolymer and polyblend polymer. Their characteristics list as follows:

	impact strength	tensile strength	enlongation	filmability	clarity
Graft copolymer	high	high	high	good	good
Blend polymer	middle	low	low	good	bad
Random copolymer	low	middle	high	bad	bad

From the above table, the characteristic properties of the graft copolmer are better than the other polymers with the same components.

Some graft polymers may have good flow behavior which will be easier for molding process (24). For the wet-spinning process, the stability of the polymer solution (25) and the dyeability of the polymer (24) will both increase since the compatibility of the graft copolymer is better than the blend polymer.

Design and Rebuilt of Polymer for Specific Properties —

The graft polymers exhibit better physical properties, e.g. impact strength, due to the better compatibility. High impact polystyrene demonstrates another example for the comparison between the graft copolymer and blend polymer (26). The grafting of MMA to the backbone polymer of rubber (27) is increase heat resistance of the rubber. Some other favorable properties have been improved by applying grafting method are oil resistance, heat resistance and some other mechanical behaviors.

From the above methods, we can take advantage of the combination of specific properties of the grafting branches to modify or to improve the backbone polymer, which can not be obtained otherwise. From practical point of view, the combination of polymers of acidic and basic, hydrophilic and hydrophobic, dyeable and undyeable etc..

It is therefore the purpose of this research to apply the graft technique to increase and develop the sprectrum of properties of the known polymers (or monomers).

A. Multiple Grafting onto the **Poly** *(c-naphthyl-i-propene) Chain* (5):

The chain (I) may undergo a partial metalation with anonic catalysts, such as sodium of lithium naphthalene (or biphenyl) in tetrahydrofuran. Each metalated group will be an initiating site for the anionic polyberization another of vinyl monomer and give graft copolymers.

The chain length of the graft, which depends on the amount of metalation of the main chain would also be studied. The utilization of the sites for the polymerization and the amount of monomer (s) will be investigated. Basides "tripolymers" or "tetrapolymers" composed of some other monomers should also be studied by following the similar procedure.

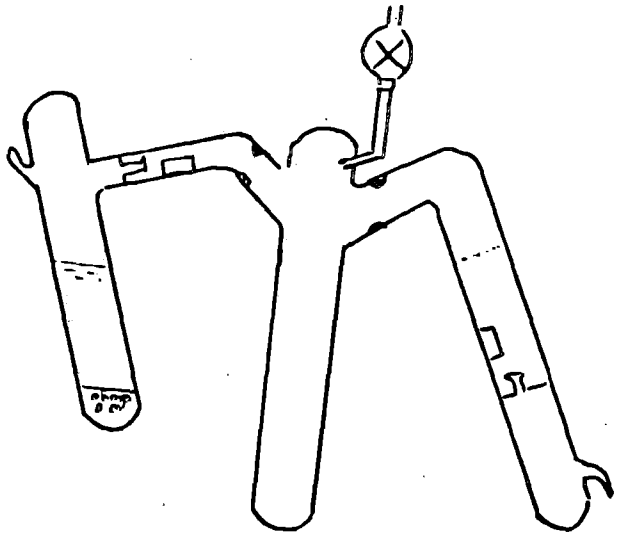
B. Macromolecular Radical Anions or Dicarbanions as Initiators for Graft Copolymerization of Some Vinyl Monomers:

Stable macromolecular radical anions will be prepared by reaction of metallic sodium with copolymers of styrene with methyl methacrylate, acrylonitrile and alkenylstyrenes. The complexes furthur initiate anionically vinyl monomers, such as acrylonitrile and vinylpyridine, with the formation of graft copolymers. The addition product of sodium with carbonic esters with biphenyl as cocatalyst is tetraphydrofuran. The colered macromolecular radical anions will be filtered from excess sodium particles through sintered glass. 20% solution of vinyl monomers is added slowly. The solution initiated at -80°C, E; ectron spin resonance study would confirm the presence of macromolecular radiocal anions.

C. Anionic Graft Copolymerization of Polyterpene Resins:

Polyterpene resins have been increasingly important in the adhesives and coatings industry. The alpha-or beta-pinene were difficult to give a high molecular weight polymers. The residual unsaturation would be highly favorable to undergo further grafting polymerization.

Synthesis of the polyterpene resins will be follwed as Fig 1., which is a modification of the usual preparation of living polymers (27). The obtained polyterpenes would be characterized and identified as before.



The limitation of commercial application of the polyterpenes is due to low molecular weight, thermally unstable, and low color stability. The graft copolymer not necessarily by anionic catalyst would change all this disadvantageous features. The unstable unsaturated olefinic sites can be grafted to another polymer (or polymers). By doing this, the mole-

cular weight and the stability would increase at the sametime.

Styrene Grafting onto the Polyvinylchloride Polychloroprene and Chlorinated Buthyl Rubber with Radical Polymerization:

Styrene can be polymerized with chromous (II) acetate- alkyl halide (RX) system as an initiator at 30°C in dimethylformamide (DMF) (28)

$$RCl + Cr^{2+} \longrightarrow R^{\cdot} + Cr^{3+} + Cl^{-}$$

In aquious solution, the chromous acetate can be prepared as follows:

$$CrCl_3 \xrightarrow[H_2O]{Zn + HCl} CrCl_2 \xrightarrow[\text{aqueous solution}]{Sat.CH_3COONa} Cr(OAc)_2$$

Styrene Monomer, PVC adn Solvent will be mixed into an ampule and cool with MeOH-dry ice. Cr^{+2} in DMF will be added under nitrogen atmosphere with a syringe. The ampule is then sealed. The amount of PVC/Cr^{+2} initiator is ca 1—2% of styrene monomer.

Polychloroprene, chlorinated butyl rubber will be reacted in the similar conditions.

Analysis, Characterization and Properteies of the Graft Copolymers

The synthesized copolymers will be studied thoroughly according to the following procedures:

A. For the solid graft-copolymer:

Elementary Analysis
Infrared spectra
X-ray
NMR————Carbon 13 NMR
Morphology————optical, electron microscopy
Thermal Analysis————DTA.
DSC. Specific heat, Dilatometry .....etc.
Dynamic Mechanical Properties ————Tan , Stress relaxation creep, Strain-stree curve, Dynamic Viscoelasticity.
Electric properties————dielectric properties, conductivity

B. For the solution graft-copolymer:

Elementary Analysis
Infrared specitra————Carbon 13 NMR
Molecule weight————Intrinsic viscosity, light scattering, Osmotic pressure, Ultracentrifugation.... ....etc.
Molecular weight distribution ————column, GPC
Molecular weight separation ————column, GPC

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1974 Seminar on Modern Engineering Technology Held

The 1974 Seminar on Modern Engineering Technology was held in Taipei July 8-26 under the joint sponsorship of the Institute of Chinese Engineers and its New York affiliate.

Over 60 Chinese engineers in the United States came to Taipei for the annual academic meeting. Local participants include more than 300 engineers and construction researchers.

The seminar this year was conducted with nine panels dealing with the various aspects of the on-going economic construction projects in Taiwan.

The nine panels, featuring speeches, discussions and field trips, covered these fields: electronics, energy supply, transportation, water resources, engineering education, house construction, petrochemistry, machinery processing and shipbuilding.

This year's seminar received a great deal of attention because the Republic of China has embarked on an impressive building program to broaden its infrastructure and economic base for further upgrading and expansion of its industry. These projects include a new railway, a large international airport, an artificial harbor, a modern steel mill, a big shipbuliding yard, electrification of the western coastal railway, a super highway and three unclear power plants. Speaking at the opening session of the seminar, Vice President C. K. Yen pointed out that engineering knowhow is even more important than financial resources to insure the successful implementation of these projects.

Progress Report on Nutrition Project

Influence of Nutrition on Susceptibility to Infectious Disease, Morbidity, Mortality and Performance

(Continued from last issue)

Supplement consumption of women during different periods are summarized in Table III. In all periods the consumption rate of PCVM groups were lower than the VM groups by approximately 2 to 3 per cent. These differeces although consistently present were not statistically significant.

Estimated daily food, protein, fat, carbohydrate, and calorie intakes were summarized in Table IV and a summary of diet composition consumed by our subjects showing its marginal nature is depicted in Table V. In all periods total average dietary intakes of women receiving protein-calorie supplementations are significantly lower than those of the VM group. For all periods combined, the PCVM supplemented group had lower estimated mean daily food intakes of 160 grams (10.3 per cent); protein, 2.7 grams (7.1 per cent); protein, 2.7 grams (7.1 per cent); carbohydrate, 35 grams (9.2 per cent); and calorie, 145 KCal (8.2 per cent). Additional nutrition in the PCVM supplement apparently had a moderate depressing effect upon regular dietary intake.

In spite of the additional alimentation in the PCVM group, no significant physical differences including body weight changes (Table VI) were found between them and the VM group. Examination of triceps and subscapula skinfold thicknesses during various stages of pregnancy and lactation revealed similar changes within both groups of women with no significant differences.

Results of 24 hours urine specimen analyses are summarized in Table VII. Creatinine excretion averaged approximately 1 gram per day for all groups and indicate no significant differences. Some interesting differences occur among urinary nitrogen excretion results. Near term of the second pregnancy, daily nitrogen excretion in both groups of women were very low (5.1 ± 6.4 and 6.4 ± 1.2 grams per day, respectively, for PCVM and VM groups.), a possible reflection of high protein anabolism accompanying final stages of fetal development. During their second lactation period, urinary nitrogen excretion is much higher. There also was a highly significant difference in daily urinary nitrogen excretion between the two groups of women with those in the PCVM group excreted 3.7 grams more than the VM group.

The above-mentioned are only part of our preliminary findings and analyses; however, further detailed analyses will be done in the near future.

Table III
SUMMARY OF SUPPLEMENT CONSUMPTION DURING DIFFERENT PERIODS

Supplement Group*	Length of Period, Months Mean	S.D.	Supplement Consumed, Per Cent Mean	S.D.
First Lactation Period Plus Interim Period Until Second Pregnancy				
PCVM	14.7	6.3	87.8	8.4
VM	15.3	5.3	90.2	6.0
VM-PCVM	0.6		2.4	
Second Pregnancy Period				
PCVM	9.2	0.4	76.5	13.2
VM	9.3	0.4	78.5	12.9
VM-PCVM	0.0		2.0	
Second Lactation Period				
PCVM	13.9	2.0	83.3	9.4
VM	14.1	1.6	86.4	9.2
VM-PCVM	0.2		3.1	
All Periods Combined				
PCVM	38.0	6.3	83.0	7.5
VM	38.5	5.8	85.9	6.6
VM-PCVM	0.5		2.9	

* All data presented in table are for 83 women in PCVM supplemented group and 91 in VM supplemented group.

Table V
ESTIMATED COMPOSITION OF COMMON DIET OF WOMEN SUBJECTS IN SUI-LIN STUDY

Component	Percentage Mean	Composition* S.D.	Mean Energy Content KCal/100 grams
Protein	2.4	1.5	10
Fat	0.7	0.6	6
Carbohydrate	24.3	1.9	97
		Total	113

* Protein and fat composition data are from direct analysis of 1738 food samples. Carbohydrate analyses are still in progress, present data are taken from analysis of 20 food samples.

Table VI
COMPARISON OF BODY WEIGHTS AND CHANGES
kg

Measurement	Supplement Group PCVM Mean ± S.D.	VM Mean ± S.D.	PCVM-VM
A. Body Weight Near Term, 1st Preg.	54.5 ± 5.4 (62)*	54.4 ± 5.0 (68)	0.1
B. Body Weight After Delivery, 1st Preg.	50.3 ± 5.3 (82)	49.5 ± 4.8 (87)	0.8
C. Body Weight After 12 Months, 1st Lact.	49.0 ± 5.0 (56)	48.2 ± 4.7 (73)	0.8
D. Body Weight 12 Months, 1st Lact.	56.2 ± 5.7 (64)	55.8 ± 5.4 (72)	0.4
E. Body Weight After Delivery, 2nd Preg.	51.6 ± 5.3 (81)	51.3 ± 5.0 (90)	0.3
F. Body Weight After 12 Months, 2nd Lact.	50.0 ± 5.6 (74)	49.4 ± 4.8 (83)	0.6
G. Difference: A - B	4.2	4.9	-0.7
H. Difference: D - E	4.6	4.5	0.1
I. Difference: D - A	1.7	1.4	0.3
J. Difference: E - B	1.3	1.8	-0.5
K. Difference: F - C	1.0	1.2	-0.2

* Numbers of Subjects.

Table VII
URINARY NITROGEN AND CREATININE EXCRETION

Supplement Group	Number of Subjects	Number of Urine Samples Analyzed	Total Urinary Nitrogen gram/day Mean ± S. D.	Total Urinary Creatinine grám/day Mean ± S.D.
Near Term, Second Pregnancy				
PCVM	23	46	5.1 ± 6.4	1.03 ± 0.28
VM	21	42	6.4 ± 1.2	1.01 ± 0.18
PCVM-VM			-0.8	0.02
Second Lactation Period				
PCVM	32	96	15.7 ± 3.0	1.11 ± 0.21
VM	39	117	12.0 ± 2.8	1.06 ± 0.18
PCVM-VM			3.7	0.05

Table IV
SUMMARY OF DAILY FOOD CONSUMPTION

Supplement Group	Number of Subjects	Number of Food Samples Analyzed	Total Food Intake, gram Mean	S.D.	Protein Intake, gram Mean	S.D.	Fat Intake, gram Mean	S.D.	Estimated Carbohydrate Intakel, gram Mean	S.D.	Estimated Caloric Intakel, KCal Mean	S.D.
*First Lactation Period (8.7 months)**												
PCVM	48	85	1588	447	40.6	13.7	12.5	9.5	385	110	1815	580
VM	44	94	1886	568	44.4	15.8	10.2	6.7	460	140	2110	680
VM-PCVM			298	(18.8)	3.8	(9.4)[2]	-2.3	(18.4)	75	(19.5)	295	(16.3)
*Interim Period (21.7 months)**												
PCVM	16	26	1392	359	32.6	8.8	9.0	7.0	340	85	1570	440
VM	22	22	1519	460	35.4	13.8	7.9	5.0	370	110	1695	540
VM-PCVM			127	(9.1)	2.8	(8.6)	-1.1	(-12.1)	30	(8.8)	125	(8.0)
*Second Pregnancy Period, Total (4.8 months)**												
PCVM	51	152	1481	382	36.8	12.3	11.1	8.4	360	95	1685	500
VM	59	175	1580	443	38.1	13.3	10.7	8.3	385	110	1790	565
VM-PCVM			99	(6.7)	1.3	(3.5)	-0.4	(-3.6)	25	(6.9)	105	(6.2)
*Second Lactation Period (7.5 months)**												
PCVM	82	265	1588	383	37.9	12.3	11.0	9.3	385	95	1790	510
VM	85	322	1749	464	41.3	11.7	10.5	7.7	425	115	1960	575
VM-PCVM			161	(10.1)	3.4	(9.0)	-0.5	(-4.5)	40	(10.4)	170	(9.5)
*Final Period (After Supplementation Was Stopped) (24 months)**												
PCVM	40	42	1647	406	40.1	11.9	11.0	6.7	400	100	1860	510
VM	57	64	1730	459	39.6	11.7	9.8	8.0	420	110	1925	560
VM-PCVM			83	(5.0)	-0.5	(-1.2)	-1.2	(-10.9)	20	(5.0)	65	(3.5)
All Periods Combined												
PCVM	83	570	1555	393	37.9	12.3	11.2	8.8	380	95	1770	510
VM	91	677	1715	472	40.6	12.8	10.4	7.7	415	115	1915	580
VM-PCVM			160	(10.3)	2.7	(7.1)	-0.8	(-7.1)	35	(9.2)	145	(8.2)

* Interval from beginning of period at which food samples were taken, months.
1. Carbohydrate intake was estimated as 0.243 of total food intake. The value 0.243 was the mean of 20 food analyses carbohydrate.
2. Numbers in parentheses indicate per cent difference between means: 100 (VM-PCVM)/PCVM.