

# Thermal Analysis in China

Liu Zhenhai\*

日本と中国の熱測定の研究者は、隣国のよしみもあって、お互いに情報と人の交流を行ってきた。1986年に杭州、1990年に大阪で、日中のジョイントシンポジウムが開かれ、1993年に西安での再会が計画されている。本レポートは、Liu Zhenhai (劉振海) 先生 (長春応用化学研究所) がまとめられた中国熱測定事情の紹介記事である。中国の学会関係者の了解を得られて、簡潔にまとめられていて、一読して中国の情報を知ることができる。

ちなみに、Liu 先生は、技術振興協会のお世話で本年1月7日から2月10日まで、筑波の繊維高分子研究所に滞在された。現在、中国における高分子熱測定の中心的メンバーの一人として、研究に、教育にご活躍中である。

(繊維高分子研究所 畠山立子)

## 1. Early historical period of thermal analysis development as an useful tool in scientific research work

In the 1950's and in the early 60's thermal analysis instruments used in China as follows :

TG, Chevenard thermobalance  
Stanton thermobalance

TMA, TG, DTA and thermodilatometer were made and used by research institutes and universities.

In the middle of sixties, DTA-TG apparatus made in our country, becomes commercially available. Now in China, series of thermal analyzers, TG, DTA, DTA-TG, DSC, TMA and TBA with computer were mainly made by two producers :

Shanghai Balance Instrument Factory (上海天平儀器廠)

Beijing Optical Instrument Factory (北京光学儀器廠)

and other producers :

Haicheng First Radio Factory (海城無線電一廠)

Dandong Precision Instrument Factory (丹東精密儀器廠)

Chengde Tester Factory (承德認驗機廠)

## 2. Society organization of thermal analysis

Prof. Huang Ziqing (黃子卿), Chemical Department of Peking University, proposed the calling of the national conference. Committee for Thermochemistry, Thermodynamics and Thermal Analysis (CTTT) was organized in Dec. 12, 1979 in Kunming (昆明) city. Prof. Huang died in 1982.

Now this Committee was renamed as the Commission on Solution Chemistry, Chemical Thermodynamics, Thermochemistry and Thermal Analysis of the Chinese Chemical Society (CSTTT CCS).

### The national society

CSTTT CCS members

1979-1986

Chairman : Prof. Huang Ziqing (黃子卿)

Vice-Chairman : Prof. Hu Riheng (胡日恒)

Members : Chen Yongti (陳榮悌)

Fu Xiancai (傅獻彩)

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Deng Yu (鄧郁)

Qu Songsheng (屈松生)

Liu Yun (劉雲)

Zhang Youmin (張友民)

Chen Jinghong (陳鏡泓)

Liu Zhenhai (劉振海)

Zhou Lixing (周立幸)

Qi Mingbi (戚名璧)

Liu Xiong (劉雄)

Advisers Professors : Yan Wenxing (嚴文興)

Li Junpu (李俊甫)

Liu Zhihe (劉致和)

1986 – 1990

Chairman : Prof. Liu Ruilin (劉瑞麟)

Members (Part of Thermal Analysis, in an alphabetical order of the names :

Chang Yongfu (常永福)

Chen Jinghong (陳鏡泓)

Liu Xiong (劉雄)

Liu Zhenhai (劉振海)

Qi Mingbi (戚名璧)

Shi Guanyi (史觀一)

Tan Fu (談夫)

Zhang Songnan (張松楠)

1990 – 1994

Chairman : Prof. Liu Ruilin (劉瑞麟)

Members (Part of Thermal Analysis, in an alphabetical order of the names :

Cal Gencai (蔡根才)

Liu Jinxiang (劉金香)

Chang Yongfu (常永福)

Liu Xiong (劉雄)

Chen Jinghong (陳鏡泓)

Liu Zhenhai (劉振海)

Gao Jiawn (高家武)

Tan Fu (談夫)

Hu Rongzu (胡榮祖)

Ye Su (葉素)

Li Yuzeng (李餘增)

Zhang Songnan (張松楠)

### The regional societies

The Committees of Thermal Analysis, Province CS and city CS were established, as follows 11 Provinces and 4 cities)

Hei Long Jiang Prov. (黑龍江省) ;

Chen Jiushun (陳久順)

Shan Xi Prov. (陝西省) ;

Song Disheng (宋迪生)

Jilin Prov. (吉林省) ;

Liu Zhenhai (劉振海)

Yun Nan Prov. (雲南省) ;

Liu Xiong (劉雄)

Liao Ning Prov. (遼寧省) ;

Zhan Qinglin (詹慶林)

Si Chuan Prov. (四川省) ;

Jiang Zhizhen (江志貞)

He Nan Prov. (河南省) ;

Li Jinghua (李靖華)

Jiang Su Prov. (江蘇省) ;

Ye Su (葉素)

Hu Bei Prov. (湖北省) ;

Xia Youlan (夏幽蘭)

Shan Dong Prov. (山東省) ;

Luo Yuchang (羅玉長)

Sun Tongshan (孫同山)

Hu Nan Prov. (湖南省) ;

Du Tingfa (杜廷發)

Xie Jianguo (謝建國)

### Cities CS

Beijing city (北京市) ;

Qi Mingbi (戚名璧)

Shanghai city (上海市) ;

Zhang Songnan (張松楠)

Guangzhou city (廣州市) ;

Chen Jinghong (陳鏡泓)

Chongqing city (重慶市) ;

Wang Yongxian (王鏞先)

Shimadzu Customer Association ;

He Bei University, 丁天惠, 高俊剛)

### 3. Society activities

Up to now, the society has sponsored 5 national conferences and 3 international conferences.

#### National Conferences

1st Conference

USA Michigan University Prof. Westrum attended

Table 1 National Conferences by CSTTT CCS

Date	Place	Organization Committee Chairman
1st 1980.10.22-27	North-western University (Xian)	Prof. Hu Riheng
2nd 1984.9.22-26	Wuhan University	Prof. Qu Song Sheng
3rd 1986.10.31-11.3	Zhejiang University (Hangzhou)	Prof. Yan Wenxing
4th 1988.8.12-15	Liaoning University (Shenyang)	Prof. Liang Chunyu
5th 1990.10.19-22	Sichuan University (Chengdu)	Prof. Deng Yu

Table 2 Contributions and Their Distribution

Solution chemistry	Chemical thermo- dynamics	Thermo- chemistry	Thermal Analysis	Total
1st	37	20	53	110
2nd	47	23	31	105
3rd	48	35	47	160
4th	55	71	56	159
5th	57	77	69	355

this conference and made lecture "Theoretical Interpretation of Heat Capacity of Solids at Low Temperature"

#### 2nd Conference

JAPAN Dr. T. Ozawa, "Non-isothermal Kinetics and its Application to Thermal Analysis" Prof. H. Suga, "Calorimetric Studies on Glassy Crystals"

6th CSTTTT CCS Conference will be held in 1992 at Zhengzhou city (鄭州市), He Nan province (河南省). Organization committee chairman is Prof. Dai Ming (戴明), He Nan Institute of Chemistry (河南化学研究所).

#### International Conferences

1st Sino-Japanese Joint Symposium on Calorimetry and Thermal Analysis, in Hangzhou, Zhejiang University, Organization Committee Chairman Prof.

Yan Wenxing

November 5-7, 1986

Contributions

Japanese contributions 27

Chinese 32

Miscellaneous 2

S. H. Goh (吳雪鴻) and S. Y. Lee

Department of Chemistry, National University of Singapore

J. Sesták

Chemical Department,

Institute of Physics of the Czechoslovak Academy of Sciences

2nd Japan-China Joint Symposium on Calorimetry and Thermal Analysis in Osaka, Kinki University, Prof. H. Suga

May 30 - June 1, 1990

Contributions

Chinese contributions 19

Japanese 33

Miscellaneous 1

International Conference on Chemical Thermodynamics and Calorimetry co-sponsored by IUPAC and CCS in Beijing, Tsinghua University, August 25 -28, 1989

Contributions 225

(Chinese contributions 116)

3rd Sino-Japanese Joint Symposium on Calorimetry and Thermal Analysis will be held in 1994 in Xian.

#### Seminars and Summer Schools on Thermal Analysis

Several seminars sponsored by Shanghai Balance Instrument Factory, Beijing Optical Instrument Factory, Perkin-Elmer, Du-Pont, Shimadzu... were also held mainly for their customers.

#### 4. Publication

熱分析法及其在陶瓷領域中的應用, 陳建邦編, 1981年 中国建築工業出版社.

差熱分析 DTA 技術及其應用指導, M. I. Popo, M. D. Judd 著, 王世華, 楊紅征譯, 1981年北京師範大學出版社.

Table 3 Seminars and Summer Schools

Date	Place	Attendants
1980.11	Shanghai (上海)	instrument and application
1981.7	Beijing (北京)	200 beginners
1984.9	Kunming (昆明)	60
1985.5	Guangzhou (廣州)	
1987.5	Guangzhou (廣州)	
1987.7	Changchun (長春)	50 polymer
1989.8	Shiyan (十堰)	45 2nd Seminar of 5 prov. South-middle area

\* here listed not in all.

熱分析, 神戸博太郎編, 劉振海等譯, 1982年化学工業出版社出版, 1985年重印。

熱分析, 宋鴻恩編著, 計算出版社。

熱學式分析儀器, 張仲礼等編, 1984年機械工業出版社。

熱分析及其應用, 陳鏡泓, 李傳儒編, 1985年科学出版社。

熱分析, 李余增編, 1987年清華大學出版社。

氣相色譜和熱分析技術, 傅若農, 常永福編, 1989年国防工業出版社。

高分子材料熱分析曲線集, 高家武等編著, 1990年科学出版社。

實用熱分析, 于伯齡, 姜膠東編著, 1990年紡織工業出版社。

常用熱分析儀器, 徐國華, 袁靖等編, 1990年上海科技出版社。

Standard: Nomenclature for Thermal Analysis, GB 6425-86.

Chinese, producers publish magazines “熱分析文集”, “熱分析技術致應用”, in which applications with their instruments in several fields are reported.

熱分析導試 ed. by 劉振海 to be published this year. Thermal Analysis Handbook has been compiled by 劉振海 and T. Hatakeyama.

## 5. Thermal analysis instruments in china

Company	Model
Perkin-Elmer	DSC-2C Series 7
Du Pont	1090 9900
Shimadzu	DT-30, DT-40
Rigaku	Thermoflex
Mettler	
Netzsch	
Setaram	
Shanghai Balance Instrument Factory (上海天平儀器廠)	ZRY-1, DSC CDR-1, WRT-2, CRY-2
Beijing Optical Instrument Factory (北京光學儀器廠)	LCT, RJ-1, PCT, LCP, SR-1, WCT-1
Haichang First Radio Factory (海城無線電一廠)	TG-1
Dandong Precision Instrument Factory (丹東精密儀器廠)	DTA CFS-1
Chengde Tester Factory (承德試驗機廠)	TMA RJY-80