



ลิขสิทธิ์มหาวิทยาลัยเชียงใหม่

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APPENDIX A

IN-HOUSE WRITTEN SOFTWARE FOR CONTROLLING THE DEVELOPED SEQUENTIAL INJECTION ANALYSIS-ANODIC STRIPPING VOLTAMMETRIC (SIA-ASV) SYSTEM

The SIA controller program was written using LabVIEW[®] software. The control panel and the example of the program diagram are shown in **Figure A.1** and **A.2**, respectively.

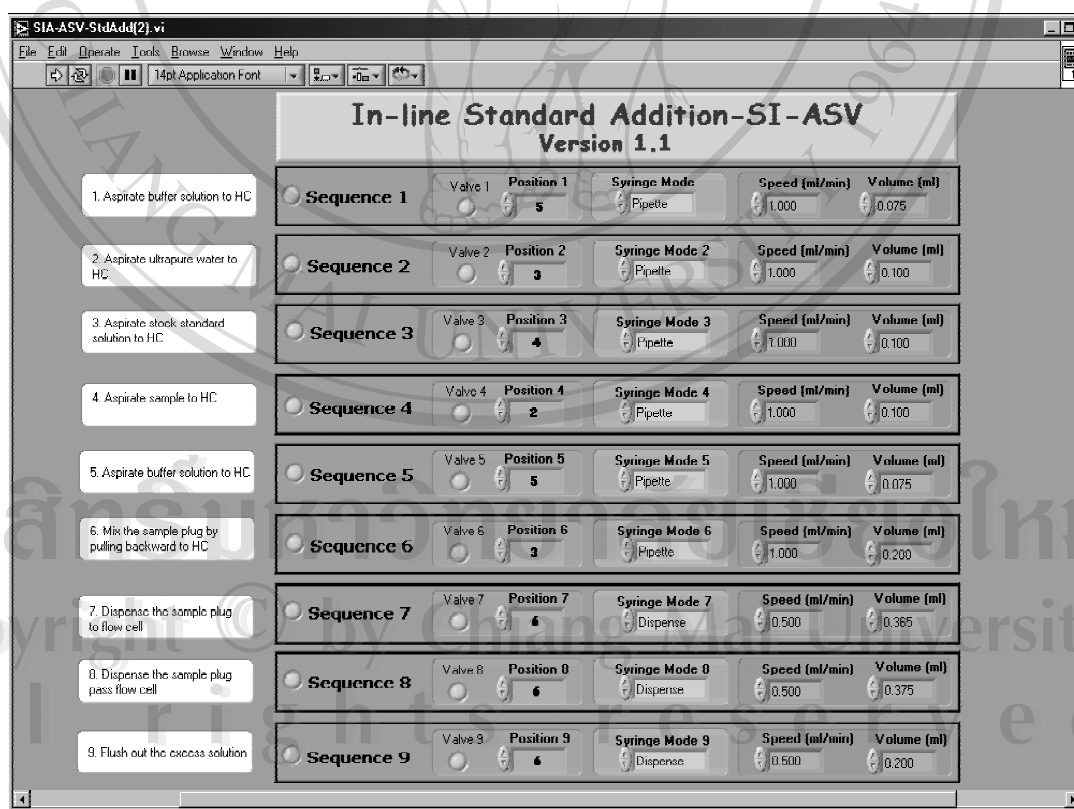


Figure A.1 The control-panel page of the in-house created program

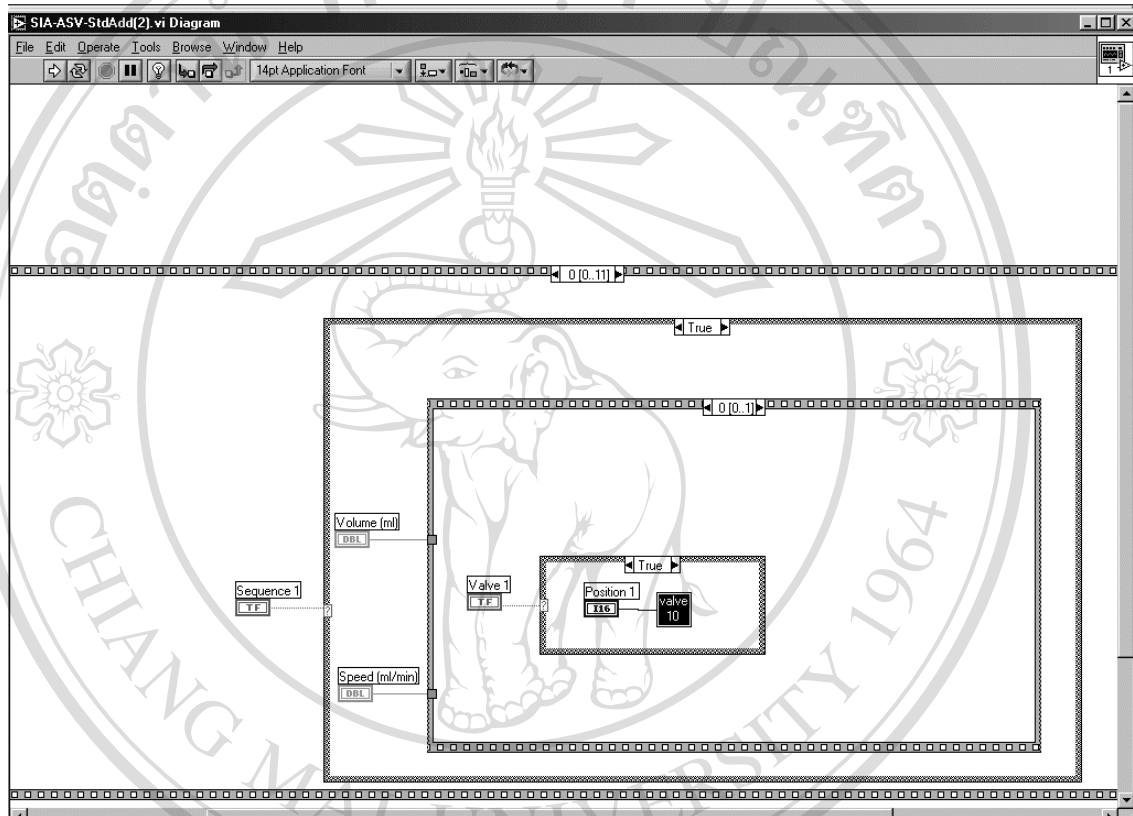


Figure A.2 An example of the program diagram of the developed SIA system

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APPENDIX B

MICROWAVE-ASSISTED DIGESTION

Microwave-assisted digestion method was used to digest coal-mining disposal soil samples. The steps of digestion are shown in **Table A.1** and **A.2**.

Table A.1 Microwave-assisted digestion steps

Step	HNO ₃ Added (ml)	HF Added (ml)	Program No.	Time (min)
1	2	4	1	61
2	-	2	2	44
3	2	-	2	44
4	-	-	9	35
5	4	-	10	26
6	2	-	11	23

Table A.2 Microwave digestion programs**a) Program number 1**

Step	Time (min)	Power (Watt)	Temperature (°C)
1	7	250	100
2	1	0	100
3	7	300	100
4	1	0	100
5	15	500	100
6	1	0	100
7	7	300	100
8	1	0	100
9	6.5	600	100
10	15	0	Cool down

b) Program number 2

Step	Time (min)	Power (Watt)	Temperature (°C)
1	7	200	110
2	1	0	110
3	7	650	110
4	1	0	110
5	7	500	110
6	1	0	110
7	5	300	110
8	15	0	Cool down

c) Program number 9

Step	Time (min)	Power (Watt)	Temperature (°C)
1	5	600	90
2	1	0	90
3	6	300	90
4	1	0	90
5	5	450	90
6	1	0	90
7	6	300	90
8	5	0	Cool down

d) Program number 10

Step	Time (min)	Power (Watt)	Temperature (°C)
1	4	600	90
2	1	0	90
3	5	300	90
4	1	0	90
5	4	450	90
6	1	0	90
7	5	300	90
8	5	0	Cool down

e) Program number 11

Step	Time (min)	Power (Watt)	Temperature (°C)
1	4	600	90
2	1	0	90
3	4	300	90
4	1	0	90
5	3	450	90
6	1	0	90
7	4	300	90
8	5	0	Cool down

CURRICULUM VITAE

NAME

Ms. Siripat Suteerapataranon

DATE OF BIRTH

February 28, 1976

EDUCATION

1993-1996

B.S. Second Honor (Industrial Chemistry),

Chiang Mai University

1998-2001

Intended Postgraduate Program (M.S. Analytical Chemistry),

Chiang Mai University

2001-2003

Ph.D. (Analytical Chemistry) (by transferring the credits from

M.S. program), Chiang Mai University

GRANTS/AWARDS

1996

Tab Nelaniti Honor Medal for outstanding student in Industrial

Chemistry of Chiang Mai University, awarded by Dr. Tab

Nelaniti Foundation.

2001-2003

The Deutsche Akademischer Austausch Dienst-Royal Golden

Jubilee (DAAD-RGJ) Ph.D. scholarship, granted by the

Thailand Research Fund (TRF) and the DAAD.

2000-2003

Partial support from the Postgraduate Education and Research

Program in Chemistry (PERCH).

- April 2003 Best Presentation Award (Oral presentation) by the Thailand Research Fund for a presentation in the RGJ-Ph.D. Congress IV, 25-27 April 2003, Jomtien Palm Beach Resort, Pattaya, Chonburi, Thailand.
- May 2003 Best Presentation Award (Oral presentation) by the PERCH for a presentation in the Second PERCH Annual Scientific Conference (PERCH 2003), 11-14 May 2003, Jomtien Palm Beach Resort, Pattaya, Chonburi, Thailand.

EXPERIENCES

- 2000-2003 Teaching assistant for chemical laboratory courses (1st year undergraduate courses).
- April 2002-January 2003 Performing research, a part of the Ph.D. thesis, at the Institut fuer Nukleare Entsorgung (INE) (Institute for Nuclear Waste Management), Forschungszentrum Karlsruhe (FZK) (Research Centre Karlsruhe), Karlsruhe, Germany.

PUBLICATIONS

1. J. Jakmunee, S. Suteerapataranon, Y. Vaneesorn and K. Grudpan. *Determination of Cadmium, Copper, Lead and Zinc by Flow Voltammetric Analysis*, Analytical Sciences 17 (2001) i399-i401.

2. **S. Suteerapataranon**, J. Jakmunee, Y. Vaneesorn and K. Grudpan *Exploiting Flow Injection and Sequential Injection Anodic Stripping Voltammetric Systems for Simultaneous Determination of Some Metals*, Talanta 58(6) (2002) 1235-1242.
3. **S. Suteerapataranon**, M. Bouby, H. Geckeis, K. Grudpan and Th. Fanghaenel *Colloid Formation of Metal Ions Released from A Contaminated Soil Studied by FIFFF Coupled to UV/VIS and ICP-MS Detection*, Mitteilungen der Deutschen Bodenkundlichen Gesellschaft 99 (2002) 205-206.

PRESENTATIONS

INTERNATIONAL CONFERENCES

1. J. Jakmunee, **S. Suteerapataranon**, Y. Vaneesorn and K. Grudpan, *Determination of Cadmium, Copper, and Zinc by Flow Voltammetric Analysis (Oral presentation)*, International Congress on Analytical Science 2001 (ICAS 2001), 6-10 August 2001, Tokyo, JAPAN.
2. J. Jakmunee, **S. Suteerapataranon**, N. Lenghor and K. Grudpan. *Sequential Injection Analysis with Voltammetric Detection for Determination of Some Metal Ions (Oral presentation)*. 11th International Conference on Flow Injection Analysis (and Related Techniques), 16-20 December 2001, Chiang Mai, THAILAND.
3. **S. Suteerapataranon**, J. Jakmunee, Y. Vaneesorn and K. Grudpan. *Flow Injection-Voltammetric Detection of Cadmium, Copper and Lead (Poster presentation)*. 11th International Conference on Flow Injection Analysis (and Related Techniques), 16-20 December 2001, Chiang Mai, THAILAND.

4. **S. Suteerapataranon**, M. Bouby, K. Grudpan, H. Geckeis and Th. Fanghaenel. *Characterization of Colloids Released from A Contaminated Soil (Poster presentation)*. The 10th International Symposium on Field-Flow Fractionation, 2-5 July 2002, Amsterdam, THE NETHERLANDS.
5. **S. Suteerapataranon**, M. Bouby, K. Grudpan, H. Geckeis and Th. Fanghaenel. *Colloid Formation of Metal Ions Released from a Contaminated Soil Studied by FI-FFF coupled to UV/Vis and ICP-MS Detection (Poster presentation)*. The Deutsche Bodenkundliche Gesellschaft Conference on Mineral Surface and Colloid Chemistry in Soil and Aquatic Environment, 8-11 October 2002, Karlsruhe, GERMANY.
6. R. Chantiwas, K. Grudpan, **S. Suteerapataranon**, H. Geckeis and R. Beckett. *Size Based Element Speciation of Micron Particles using Gravitational FFF (Oral presentation)*. The 11th International Symposium on Field-Flow Fractionation, 7-10 October 2003, Cleveland, Ohio, USA.
7. **S. Suteerapataranon**, J. Jakmunee and K. Grudpan. *Sequential Injection-Anodic Stripping Voltammetry with Standard Addition for Determination of Some Metals (Oral presentation)*. The 20th Anniversary of the Japanese Association of Flow Injection Analysis (JAFIA) Foundation and the 44th Semi-Annual Meeting, 6-7 November 2003, Okayama, JAPAN.
8. **S. Suteerapataranon**, J. Jakmunee and K. Grudpan. *On-line Standard Addition Sequential Injection-Anodic Stripping Voltammetry for Determination of Some Metals (Oral presentation)*. The 12th International Conference on Flow Injection Analysis (12thICFIA), 7-13 December 2003, Mérida, VENEZUELA.

9. L. Patimapornlert, **S. Suteerapataranon**, N. Lenghor, J. Jakmunee and K. Grudpan. *Sequential Injection with Lab-at-Valve (LAV) for Potentiometric Determination of Chloride (Poster presentation)*. The 12th International Conference on Flow Injection Analysis (12thICFIA), 7-13 December 2003, Mérida, VENEZUELA.
10. R. Chantiwas, **S. Suteerapataranon**, H. Geckeis, R. Beckett and K. Grudpan. *Gravitational Field-Flow Fractionation-Inductively Coupled Plasma Mass Spectrometry: An Approach For Size-Based Elemental Speciation (Poster presentation)*. The 12th International Conference on Flow Injection Analysis (12thICFIA), 7-13 December 2003, Mérida, VENEZUELA.

NATIONAL CONFERENCES

1. **S. Suteerapataranon**, J. Jakmunee, Y. Vaneesorn and K. Grudpan. *On-line Voltammetric System for Metals Determination in Water (Poster Presentation)*. 26th Congress on Science and Technology, 18-20 October 2000, Bangkok.
2. **S. Suteerapataranon**, J. Jakmunee, Y. Vaneesorn and K. Grudpan. *Study on Cleaning Mercury Film Electrode in A Flow Voltammetric System (Poster Presentation)*. 27th Congress on Science and Technology, 16-18 October 2001, Hat Yai.
3. **S. Suteerapataranon**, J. Jakmunee, Y. Vaneesorn and K. Grudpan. *Flow-Voltammetric System for Dtermination of Trace Metals (Poster Presentation)*. The First PERCH Annual Scientific Conference, 12-15 May 2002, Garden Seaview Resort Hotel, Pattaya, Chonburi.

4. **S. Suteerapataranon**, M. Bouby, K. Grudpan, H. Geckeis and Th. Fanghaenel. *Characterization of Colloids Released from A Contaminated Soil (Poster Presentation)*. The 1st Annual Symposium on TRF Senior Research Scholar on Flow-Based Analysis, 1 September 2002, Department of Chemistry, Faculty of Science, Chiang Mai University, Chiang Mai.
5. **S. Suteerapataranon**, M. Bouby, H. Geckeis, Th. Fanghaenel and K. Grudpan. *Study of the Released of Some Metal Ions from a Contaminated Soil in a Lignite Mining Tailing Area in Thailand (Oral Presentation)*. The RGJ-Ph.D. Congress IV, 25-27 April 2003, Jomtien Palm Beach Resort, Pattaya, Chonburi.
6. **S. Suteerapataranon**, M. Bouby, H. Geckeis, Th. Fanghaenel and K. Grudpan. *Investigation of Colloid Formation of Metal Ions Released from a Contaminated Soil by FIFFF-UV/Vis-ICP-MS (Oral Presentation)*. The Second PERCH Annual Scientific Conference (PERCH 2003), 11-14 May 2003, Jomtien Palm Beach Resort, Pattaya, Chonburi.
7. **S. Suteerapataranon**, M. Bouby, H. Geckeis and K. Grudpan. *The Release of Metal Ions from Contaminated Soil in Mining Areas to the Environment by Humic Acid Colloids (Poster Presentation)*. The 2nd Annual Symposium on TRF Senior Research on Flow-based Analysis, 6 September 2003, Chiang Mai University, Chiang Mai.