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APPENDIX

The calculation for the speciation of As(III) and As(V)

Step 1 Three calibration graphs are constructed; the example graphs are showed in Figure A1.

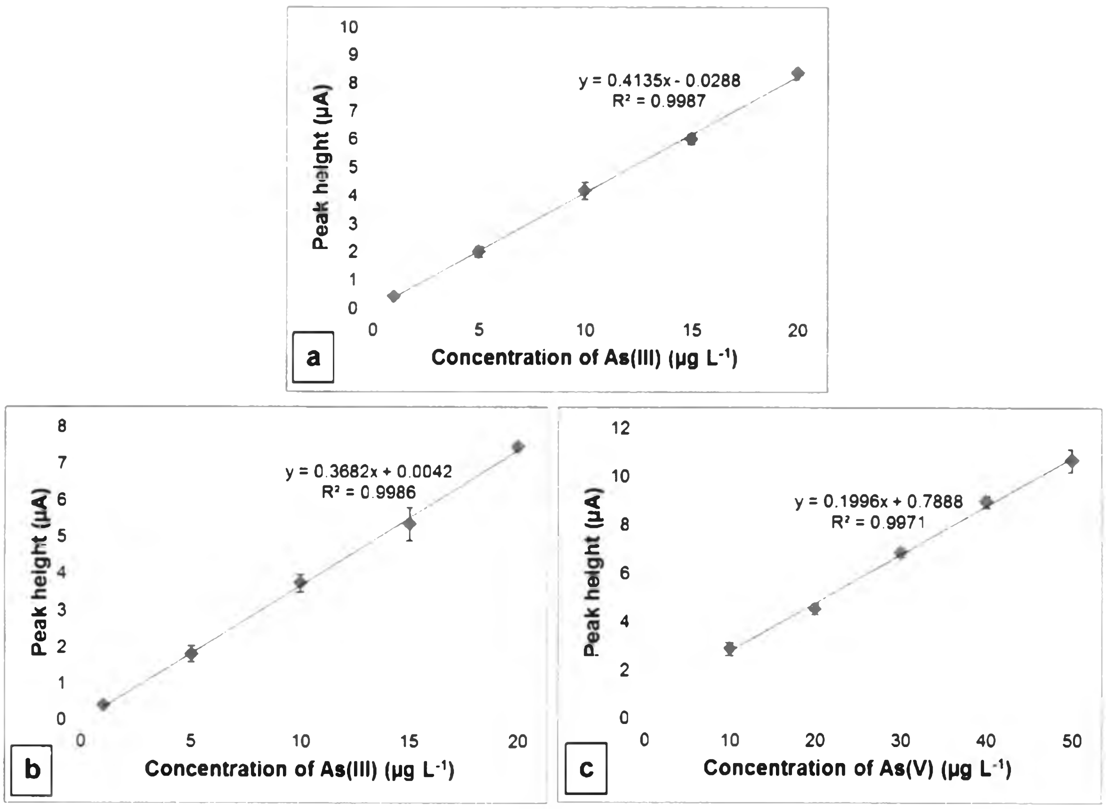

Figure A1 Calibration graphs of As(III) concentration under the applied deposition potential of −0.5 V (a), As(III) concentration under the applied deposition potential of −1.5 V (b) and As(V) concentration under the applied deposition potential of −1.5 V (c).

Step 2 Calibration equations are obtained from the calibration graphs, for example:

As(III) under the deposition potential of −0.5 V: $y = 0.4135x - 0.0288$ (Equation A1)

As(III) under the deposition potential of −1.5 V: $y = 0.3682x + 0.0042$ (Equation A2)

As(V) under the deposition potential of −1.5 V: $y = 0.1996x + 0.7888$ (Equation A3)

Step 3 Standard or sample solution is analyzed by the proposed method under both applied deposition potentials of −0.5 V and −1.5 V. The peak heights of As oxidation are obtained from each applied deposition potential.

Table A1 Details of the determination of As(III) and As(V) in mixed standard and sample solutions using SI/ASV with Au-SPCE.

Sample	Spiked concentration (μg L^{-1})		Number of analysis	**Step 3** Obtained peak height (μA)		**Step 4** Found concentration of As(III) (μg L^{-1})	**Step 5** Corrected peak height of As(III) (μA)	**Step 6** Calculated peak height of As(V) (μA)	**Step 7** Found concentration of As(V) (μg L^{-1})	Average found concentration (μg L^{-1})		%Recovery	
	As(III)	As(V)		E_{dep} = −0.5 V	E_{dep} = −1.5 V					As(III)	As(V)	As(III)	As(V)
No.1	5.00	40.0	1st	1.97	10.3	4.83	1.78	8.56	38.9	4.94±0.14	38.9±0.4	98.9	97.3
			2nd	2.08	10.4	5.09	1.88	8.47	38.5				
			3rd	2.00	10.4	4.90	1.81	8.64	39.3				
No.2	10.0	30.0	1st	4.16	10.2	10.1	3.73	6.51	28.6	10.2±0.3	28.5±0.6	102	95.0
			2nd	4.11	10.3	10.0	3.69	6.57	29.0				
			3rd	4.35	10.2	10.6	3.90	6.35	27.9				
No.3	15.0	20.0	1st	5.99	10.3	14.6	5.37	4.96	20.9	14.6±0.03	20.8±0.2	97.2	104
			2nd	6.01	10.3	14.6	5.38	4.91	20.7				
			3rd	5.99	10.3	14.5	5.36	4.98	21.0				
SRM 1643e	58.98±0.7 (certified concentration of total As)		1st	0.22	12.4	0.61	0.23	12.2	57.3	0.60±0.4	57.7±0.4	-	-
			2nd	0.21	12.5	0.58	0.22	12.3	57.8				
			3rd	0.22	12.6	0.60	0.23	12.4	58.0				

Step 4 Concentration of As(III) can be calculated by using Equation A1 and peak height of As(III) obtained from Step 3.

Step 5 Peak height of As(III) under the applied deposition potential of −1.5 V can be corrected by using Equation A2 and As(III) concentration calculated from Step 4.

Step 6 Peak height of As(V) under the applied deposition potential of −1.5 V can be calculated by subtraction of As peak height obtained from Step 3 by As(III) peak height corrected from Step 5.

Step 7 Concentration of As(V) can be calculated by using Equation A3 and peak height of As(V) calculated from Step 6.

VITA

Mr. Eakkasit Punrat was bom on October 14th, 1986 in Bangkok, Thailand. He graduated with high school degree from Wat Rajabopit School, Bangkok in 2003. He received his Bachelor's Degree of Science (Chemisty) from Chulalongkorn University in 2007. And then, he consequently became a graduate student in Analytical Chemistry, Department of Chemistry, Faculty of Science, Chulalongkorn University as a member of Electrochemical and Optical Spectroscopy Research Unit under the direction of Professor Dr. Orawon Chailapakul and Assistant Professor Dr. Suchada Chuanuwatanakul. In 2008-2009, he was a Master's student with the scholarship from Asian Development Bank (ADB). Then in 2010, he changed his education program to become a Ph.D. student. Since then, he has received the grant from the Thailand Research Fund and Chulalongkorn University through the Royal Golden Jubilee Ph.D. program that he had an opportunity to do the research in Analytical Chemistry Group, Okayama University, Japan for 1 year. After he came back, he continually did his research and then graduated with a Ph.D. Degree in Chemistry of academic year 2013 from Chulalongkorn University.

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List of publications:

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