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APPENDIX

Self-assembly Monolayer (SAM) Formation of Carboxyl-terminated Alkanethiol onto Gold Surface.

Table A-1 Water contact angle and frequency shift due to SAM formation ($\triangle f_s$) of 10 mM MPA as a function of time.

Time (min)	Water Contact angle (degree)	$\triangle f_s$ (Hz)
Gold	103.6±3.9	-
8	43.4±2.1	4
16	40.6±2.5	12
24	35.2±1.9	19
48	35.4±2.1	20

Table A-2 Frequency shift due to SAM formation of each alkanethiol ($\triangle f_s$) as a function of concentration.

Concentration (mM)	$\triangle f_s$ (Hz)		
	MUA	MPA	DTDPA
5	27	15	8
10	22	19	14
15	25	15	10

Table A-3 Water contact angle of SAM of alkanethiol as a function of thiol concentration.

Concentration (mM)	Water contact angle (degree)		
	MUA	MPA	DTDPA
5	57.0±2.9	59.8±1.1	62.6±2.7
10	54.6±2.4	36.6±1.8	48.0±2.0
15	53.4±1.5	41.6±2.2	54.2±0.8

Activation of Carboxyl Groups of SAM-modified Substrates

Table A-4 Water contact angle and frequency shift due to the activation ($\triangle f_a$) of the MPA-modified substrate as a function of immersion time using 15:45 mM of NHS/EDCI.

Time (min)	Water contact angle (degree)	$\triangle f_a$ (Hz)
0	36.0±1.8	-
15	50.6±1.7	22.2
30	54.6±1.9	25.7
45	54.0±3.1	18.7
60	52.0±3.1	16.0
90	51.8±1.5	20.0
120	45.2±2.0	20.0
240	44.0±0.7	19.0

Table A-5 Water contact angle due to the activation ($\triangle f_a$) of the MPA-modified substrate as a function of NHS/EDCI concentration using 30 min immersion time.

Concentration NHS(mM)/EDCI(mM)	Water contact angle (degree)
control	36.6±1.8
10/30	52.2±1.1
15/45	56.2±2.6
30/90	54.0±2.2

Table A-6 Frequency shift due to the activation ($\triangle f_a$) of the MPA-modified substrate as a function of NHS/EDCI concentration using 30 min immersion time.

Concentration NHS(mM)/EDCI(mM)	$\triangle f_a$ (Hz)
control	-2
10/30	21
15/45	27
30/90	25

Immobilization of Monoclonal Antibody (MAb) against *Vibrio harveyi*

Table A-7 Frequency shift due to the MAb immobilization ($\triangle f_i$) on the NHS-modified substrate as a function of immobilization time using 0.1 mg/mL MAb.

Immobilization Time (h)	$\triangle f_i$ (Hz)
8	28.3±3.2
15	38.3±9.2
24	40.0±3.6

Table A-8 Frequency shift due to the MAb immobilization ($\triangle f_i$) as a function of MAb concentration using the immobilization time of 15h.

Concentration (mg/mL)	$\triangle f_i$ (Hz)
control	-2.0
0.05	20.0
0.1	22.0
0.5	27.0
1	27.5

Table A-9 Frequency shift due to *V. harveyi* binding ($\triangle f_b$) with the MAb-immobilized substrate after the treatment with blocking reagents. The concentration of *V. harveyi* used was 10^5 CFU/mL.

Blocking reagent	$\triangle f_b$ (Hz)
None	4.0
1% BSA	21.0
6%ethanolamine	10.5

Table A-10 Frequency shift due to *V. harveyi* binding ($\triangle f_b$) with the MAb-immobilized substrate as a function of MAb concentration used in the immobilization step after the treatment with 1%BSA.

Time (min)	$\triangle f_b$ (Hz)
0.05	11.0
0.1	21.0
0.5	9.0
1	6.0

Table A-11 Frequency shifts due to MAb immobilization ($\triangle f_i$) and *V. harveyi* binding ($\triangle f_b$) of the MPA-CE mixed SAM as a function of dilution ratio (%MPA).

% MPA	$\triangle f_i$ (Hz)	$\triangle f_b$ (Hz)
100%	34	21
80%	41	23
60%	39	34
40%	44	33
20%	47.8	39

Table A-12 Frequency shifts due to MAb immobilization ($\triangle f_i$) and *V. harveyi* binding ($\triangle f_b$) of the MPA-ME mixed SAM as a function of dilution ratio (%MPA).

% MPA	$\triangle f_i$ (Hz)	$\triangle f_b$ (Hz)
100%	34	21
80%	51	40
60%	24	17
40%	18	14
20%	16	19

Table A-13 Frequency shift due to *V. harveyi* binding ($\triangle f_b$) of the MAb-modified substrate prepared from MPA monolayer as a function of *V. harveyi* concentration.

Log concentration (CFU/mL)	$\triangle f_b$ (Hz)
control	2.0
2	-12±7.0
3	7±6.7
4	17±4.0
5	21±7.2
6	27±9.5
7	30±4.4
8	29±14

Table A-14 Frequency shift due to bacteria binding ($\triangle f_b$) of the MAb-immobilized substrate prepared from MPA monolayer.

Bacteria	$\triangle f_b$ (Hz)
control	2.0
V. harveyi	21.0±7.2
V. vulnificus	5.6±3.8
V. paraheamolyticus	-4.0±3.2

Table A-15 Frequency shift due to *V. harveyi* binding ($\triangle f_b$) of the MAb-immobilized substrate prepared from MPA monolayer after 1 cycle of regeneration in 0.1 M glycine/HCl buffer solution (pH = 2.3) as a function of regeneration time.

Time (min)	$\triangle f_b$ (Hz)
15	4.0
30	9.0
45	8.0
60	16.0
120	-21.0

VITAE

Miss Sutawan Buchatip was born in Kalasin, Thailand. She received a bachelor degree of Science form Department of Chemistry, Faculty of Science, Burapha University, Chonburi, Thailand in 2003. In the same year, she was admitted to a Master's degree in Program of Petrochemistry and Polymer science, Faculty of Science, Chulalongkorn University and completed program in 2006.