

ESI Table S3 Second order experimental design for resolution DMA/As^V (R₃) and separation time (T)

Resolution DMA/As^V (R₃)

	1'	2'	3'	4'	5'	6'	7'	8'	9'	10'	11'	12'	13'	14'	15'	16'	17'	18'
(1)	-1	+1	-1	+1	-1	+1	-1	+1	0	0	-α	+α	0	0	0	0	0	0
(2)	-1	-1	+1	+1	-1	-1	+1	+1	0	0	0	0	-α	+α	0	0	0	0
(6)	-1	-1	-1	-1	+1	+1	+1	+1	0	0	0	0	0	0	-α	+α	0	0
R ₃	1.62	1.40	0.74	2.38	0.78	1.63	0.75	2.08	1.94	1.98	0.65	2.24	1.58	1.60	2.02	1.95	2.05	2.05

Level	-α			-1			0			+1			+α		
Step	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
(1)	95	10	65	96	14	69	97.5	20	75	99	26	81	100	30	85
(2)	2	3	7	2.2	3.4	7.4	2.5	4	8	2.8	4.6	8.6	3	5	9
(6)		20			34			30			36			40	

Separation time (T)

	1''	2''	3''	4''	5''	6''	7''	8''	9''	10''	11''	12''
(1)	-1	+1	-1	+1	0	0	-α	+α	0	0	0	0
(5)	-1	-1	+1	+1	0	0	0	0	-α	+α	0	0
T	702	828	558	600	648	654	606	678	810	558	624	618

Level	-α			-1			0			+1			+α		
Step	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
(1)	95	10	65	95.7	12.9	67.9	97.5	20	75	99.3	27.1	82.1	100	30	85
(5)		0.9			1.0			1.2			1.4			1.5	

Models proposed and validated

$$y_{R_3} = 2.02 + 0.46.x'_1 + 0.04.x'_2 - 0.07.x'_6 + 0.29.x'_1.x'_2 + 0.09.x'_1.x'_6 + 0.04.x'_2.x'_6 - 0.17.x'_1.x'_2.x'_6 - 0.25.x'^2_1 - 0.20.x'^2_2 - 0.06.x'^2_6$$

$$y_T = 638 + 34.x''_1 - 92.x''_5 - 20.x''_1.x''_5 + 3.x''^2_1 + 25.x''^2_5$$