Supplementary information to the article

Formation of "hair" inclusions and growth optimization for large aperture KDP crystals based on numerical simulation method

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Table S1. The complete configuration schedule for L25 (5^6) orthogonal experiment.

Test number	Column 1	Column 2	Column 3	Column 4	Column 5	Column 6
1	1	1	1	1	1	1
2	1	2	3	4	5	2
3	1	3	5	2	4	3
4	1	4	2	5	3	4
5	1	5	4	3	2	5
6	2	1	5	4	3	5
7	2	2	2	2	2	1
8	2	3	4	5	1	2
9	2	4	1	3	5	3
10	2	5	3	1	4	4
11	3	1	4	2	5	4
12	3	2	1	5	4	5
13	3	3	3	3	3	1
14	3	4	5	1	2	2
15	3	5	2	4	1	3
16	4	1	3	5	2	3
17	4	2	5	3	1	4
18	4	3	2	1	5	5
19	4	4	4	4	4	1
20	4	5	1	2	3	2
21	5	1	2	3	4	2
22	5	2	4	1	3	3
23	5	3	1	4	2	4
24	5	4	3	2	1	5
25	5	5	5	5	5	1

Table S2. Orthogonal experiment results.

Test number	A	B	C	D	*T* - *C.V* (×10^{-5})				*σ* - *C.V* (%)				*σ* - *avg* (%)			
					PRx	PRy	PYx	PYy	PRx	PRy	PYx	PYy	PRx	PRy	PYx	PYy
1	1	1	1	1	0.00	0.00	0.00	0.00	0.62	0.40	1.07	0.55	0.26	0.26	0.24	0.25
2	1	2	3	2	0.00	0.00	0.00	0.00	1.42	1.30	10.66	7.49	2.00	2.00	1.39	1.46
3	1	3	5	3	0.00	0.00	0.00	0.00	1.52	1.20	5.07	3.51	1.48	1.48	1.10	1.18
4	1	4	2	4	0.00	0.00	0.00	0.00	2.32	2.30	11.06	6.06	0.99	0.99	0.59	0.67
5	1	5	4	5	0.00	0.00	0.00	0.00	1.41	1.36	5.84	3.93	0.49	0.49	0.36	0.39
6	2	1	5	5	0.31	0.21	0.16	0.11	1.84	2.10	9.35	5.88	0.99	0.99	0.61	0.67
7	2	2	2	1	1.10	1.18	0.57	0.64	0.49	0.39	1.33	0.80	0.45	0.46	0.43	0.43
8	2	3	4	2	4.52	4.43	1.69	1.21	1.45	1.45	2.55	0.96	0.21	0.21	0.19	0.20
9	2	4	1	3	3.59	3.16	1.43	1.54	3.26	2.76	7.60	5.34	1.87	1.88	1.10	1.21
10	2	5	3	4	6.78	2.99	10.71	8.28	4.82	3.60	8.34	5.34	1.39	1.42	0.86	0.98
11	3	1	4	4	0.19	0.21	0.12	0.12	2.51	2.11	7.52	5.74	1.95	1.95	1.18	1.29
12	3	2	1	5	11.45	7.28	5.95	3.95	5.13	4.22	14.69	8.02	1.39	1.41	0.56	0.66
13	3	3	3	1	2.30	2.03	1.13	1.10	0.58	0.56	2.33	1.45	0.92	0.92	0.83	0.85
14	3	4	5	2	6.65	4.60	9.09	6.79	2.27	1.29	4.45	1.92	0.35	0.37	0.30	0.33
15	3	5	2	3	9.30	6.44	3.14	2.63	4.86	3.22	3.65	1.78	0.14	0.15	0.12	0.12
16	4	1	3	3	6.88	6.74	2.43	1.68	1.69	1.75	6.53	2.84	0.46	0.46	0.36	0.39
17	4	2	5	4	0.66	0.70	0.39	0.35	0.63	0.64	2.48	1.37	0.21	0.21	0.19	0.20
18	4	3	2	5	10.72	4.05	19.24	9.73	7.33	6.40	14.11	8.71	1.77	1.78	0.73	0.90
19	4	4	4	1	15.13	18.07	3.09	2.53	0.95	1.11	3.78	2.05	1.39	1.40	1.18	1.24
20	4	5	1	2	11.01	10.55	4.76	5.64	2.28	1.88	3.68	1.90	0.60	0.61	0.49	0.53
21	5	1	2	2	2.56	2.07	1.20	1.21	1.46	1.31	4.90	3.33	1.41	1.41	1.08	1.15
22	5	2	4	3	6.92	4.41	9.99	6.74	3.47	2.30	8.73	4.49	0.78	0.78	0.52	0.59
23	5	3	1	4	21.25	12.87	6.50	6.15	8.02	4.78	7.85	3.55	0.23	0.25	0.16	0.18
24	5	4	3	5	6.47	3.82	16.35	6.42	4.55	2.56	16.51	4.69	0.13	0.14	0.09	0.11
25	5	5	5	1	30.80	26.62	11.36	8.24	1.36	1.41	6.87	3.02	1.86	1.87	1.47	1.59

Table S3. Range analysis results for indicator of *T* - *C.V*.

Unit: $\times 10^{-5}$

	PRx				PRy				PYx				PYy			
	A	**B**	**C**	**D**	**A**	**B**	**C**	**D**	**A**	**B**	**C**	**D**	**A**	**B**	**C**	**D**
K1	0.00	9.93	47.29	49.32	0.00	9.22	33.86	47.90	0.00	3.90	18.64	16.15	0.00	3.12	17.29	12.50
K2	16.29	20.13	23.68	24.73	11.96	13.57	13.73	21.64	14.55	16.91	24.16	16.74	11.77	11.69	14.20	14.85
K3	29.88	38.79	22.42	26.69	20.57	23.39	15.58	20.73	19.43	28.56	30.62	16.98	14.58	18.18	17.47	12.59
K4	44.40	31.84	26.76	28.88	40.11	29.64	27.12	16.78	29.91	29.95	14.88	17.72	19.93	17.27	10.60	14.91
K5	68.00	57.89	38.42	28.95	49.78	46.59	32.12	15.36	45.40	29.97	20.99	41.70	28.76	24.79	15.49	20.21
$K1_{avg}$	0.00	1.99	9.46	9.86	0.00	1.84	6.77	9.58	0.00	0.78	3.73	3.23	0.00	0.62	3.46	2.50
$K2_{avg}$	3.26	4.03	4.74	4.95	2.39	2.71	2.75	4.33	2.91	3.38	4.83	3.35	2.35	2.34	2.84	2.97
$K3_{avg}$	5.98	7.76	4.48	5.34	4.11	4.68	3.12	4.15	3.89	5.71	6.12	3.40	2.92	3.64	3.49	2.52
$K4_{avg}$	8.88	6.37	5.35	5.78	8.02	5.93	5.42	3.36	5.98	5.99	2.98	3.54	3.99	3.45	2.12	2.98
$K5_{avg}$	13.60	11.58	7.68	5.79	9.96	9.32	6.42	3.07	9.08	5.99	4.20	8.34	5.75	4.96	3.10	4.04
R	13.60	9.59	4.97	4.92	9.96	7.47	4.03	6.51	9.08	5.21	3.15	5.11	5.75	4.33	1.38	1.54

Table S4. Range analysis results for indicator of σ - *C.V.*

Unit: %

	PRx				PRy				PYx				PYy			
	A	**B**	**C**	**D**	**A**	**B**	**C**	**D**	**A**	**B**	**C**	**D**	**A**	**B**	**C**	**D**
K1	7.29	8.11	19.31	3.99	6.56	7.67	14.06	3.87	33.71	29.38	34.88	15.38	21.54	18.34	19.36	7.87
K2	11.86	11.14	16.45	8.88	10.30	8.86	13.63	7.23	29.17	37.90	35.07	26.25	18.32	22.16	20.67	15.60
K3	15.35	18.91	13.07	14.79	11.41	14.40	9.76	11.23	32.63	31.92	44.37	31.58	18.92	18.19	21.81	17.95
K4	12.87	13.35	9.79	18.30	11.78	10.01	8.32	13.43	30.59	43.40	28.44	37.27	16.87	20.06	17.18	22.07
K5	18.86	14.72	7.61	20.27	12.36	11.49	6.65	16.65	44.87	28.38	28.21	60.50	19.07	15.97	15.70	31.23
$K1_{avg}$	1.46	1.62	3.86	0.80	1.31	1.53	2.81	0.77	6.74	5.88	6.98	3.08	4.31	3.67	3.87	1.57
$K2_{avg}$	2.37	2.23	3.29	1.78	2.06	1.77	2.73	1.45	5.83	7.58	7.01	5.25	3.66	4.43	4.13	3.12
$K3_{avg}$	3.07	3.78	2.61	2.96	2.28	2.88	1.95	2.25	6.53	6.38	8.87	6.32	3.78	3.64	4.36	3.59
$K4_{avg}$	2.57	2.67	1.96	3.66	2.36	2.00	1.66	2.69	6.12	8.68	5.69	7.45	3.37	4.01	3.44	4.41
$K5_{avg}$	3.77	2.94	1.52	4.05	2.47	2.30	1.33	3.33	8.97	5.68	5.64	12.10	3.81	3.19	3.14	6.25
R	2.31	2.16	2.34	3.26	1.16	1.35	1.48	2.55	3.14	3.00	3.23	9.03	0.93	1.24	1.22	4.67

Table S5. Range analysis results for indicator of σ - *avg*.

Unit: %

	PRx				PRy				PYx				PYy			
	A	**B**	**C**	**D**	**A**	**B**	**C**	**D**	**A**	**B**	**C**	**D**	**A**	**B**	**C**	**D**
K1	5.22	5.07	4.35	4.88	5.22	5.07	4.41	4.91	3.68	3.47	2.55	4.15	3.95	3.75	2.83	4.36
K2	4.91	4.83	4.76	4.57	4.96	4.86	4.79	4.60	3.19	3.09	2.95	3.45	3.49	3.34	3.27	3.67
K3	4.75	4.61	4.90	4.73	4.80	4.64	4.94	4.75	2.99	3.01	3.53	3.20	3.25	3.31	3.79	3.49
K4	4.43	4.73	4.82	4.77	4.46	4.78	4.83	4.82	2.95	3.26	3.43	2.98	3.26	3.56	3.71	3.32
K5	4.41	4.48	4.89	4.77	4.45	4.54	4.92	4.81	3.32	3.30	3.67	2.35	3.62	3.61	3.97	2.73
$K1_{avg}$	1.04	1.01	0.87	0.98	1.04	1.01	0.88	0.98	0.74	0.69	0.51	0.83	0.79	0.75	0.57	0.87
$K2_{avg}$	0.98	0.97	0.95	0.91	0.99	0.97	0.96	0.92	0.64	0.62	0.59	0.69	0.70	0.67	0.65	0.73
$K3_{avg}$	0.95	0.92	0.98	0.95	0.96	0.93	0.99	0.95	0.60	0.60	0.71	0.64	0.65	0.66	0.76	0.70
$K4_{avg}$	0.89	0.95	0.96	0.95	0.89	0.96	0.97	0.96	0.59	0.65	0.69	0.60	0.65	0.71	0.74	0.66
$K5_{avg}$	0.88	0.90	0.98	0.95	0.89	0.91	0.98	0.96	0.66	0.66	0.73	0.47	0.72	0.72	0.79	0.55
R	0.16	0.12	0.11	0.06	0.15	0.11	0.11	0.06	0.15	0.09	0.22	0.36	0.14	0.09	0.23	0.33

Note: The calculation formulas are as follows: $Ki^j = \sum_{i=1}^{5} xt$, $Ki_{avg}^{\ j} = Ki^j/5$, $R = max\{Ki_{avg}^{\ j}\} - min\{Ki_{avg}^{\ j}\}$; i = 1, 2, 3, 4, 5; j = A, B, C, D; xt represents the results for different indicators, specifically including: coefficient of variation for crystal surface temperature (T - $C.V$) and supersaturation (σ - $C.V$), average surface supersaturation (σ - *avg*); PR and PY indicate the prismatic and pyramidal faces, respectively. Mark x and y as the long-edge and short-edge.