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Supporting information for article:

Usefulness of oils for cleaning host matrix and for cryoprotection of LCP crystals

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Table S1 Crystallographic statistics for datasets from crystals with no treatment.

crystal	a, c† (Å)	mosaicity (˚)	max resolution (Å)	R_{sym}‡(%)	$I/\sigma(I)$	Wilson-B (Å^2)
1-1	60.98, 109.99	0.110	1.78	11.4	9.54	22.3
1-2	60.72, 108.45	0.165	1.79	8.7	13.05	25.6
1-3	60.90, 107.55	0.238	1.95	14.5	8.58	23.9
1-4	60.75, 108.83	0.169	1.89	10.1	11.04	30.5
1-5	60.59, 107.63	0.112	1.74	9.4	12.55	21.3
1-6	60.90, 108.36	0.101	1.70	9.5	11.97	19.4
1-7	60.72, 107.92	0.096	1.86	11.4	10.03	24.0
1-8	60.63, 108.41	0.141	1.89	9.3	12.52	28.6
1-9	60.76, 107.46	0.103	1.87	11.5	10.32	21.4
1-10	60.96, 109.60	0.075	1.80	10.7	10.43	23.1
1-11	60.88, 110.14	0.081	1.72	15.8	8.18	20.0
1-12	60.73, 108.20	0.086	1.71	9.2	11.64	19.5
1-13	60.85, 107.07	0.229	1.95	14.7	8.78	24.0
average	60.8 ±0.1, 108 ±1	0.13 ±0.05				23 ±3

Values in the final row are the average ± standard deviation.

† All crystals belong to the space group $P6_3$

‡ $R_{sym} = \Sigma_{hkl}\Sigma_i| I_{hkl,i} - \langle I_{hkl}\rangle|/\Sigma_{hkl}\Sigma_i I_{hkl,i}$.

Table S2 Crystallographic statistics for datasets from crystals treated with squalane.

crystal	*a*, *c*† (Å)	mosaicity (˚)	max resolution (Å)	R_{sym}‡(%)	$I/\sigma(I)$	Wilson-*B* (Å^2)
2-1	60.70, 105.10	0.097	1.79	12.0	8.04	26.9
2-2	60.75, 106.43	0.136	1.85	12.1	8.34	25.3
2-3	60.50, 102.75	0.186	1.98	10.0	10.53	27.8
2-4	60.66, 101.40	0.089	1.64	10.0	9.81	20.1
2-5	60.65, 100.91	0.138	2.19	12.8	9.30	50.3
2-6	60.72, 102.15	0.159	1.94	12.2	9.07	25.9
2-7	60.66, 105.85	0.183	1.81	10.5	8.80	26.8
2-8	60.64, 101.78	0.160	1.83	11.1	10.33	23.8
2-9	60.52, 107.65	0.165	1.76	10.1	11.43	21.9
2-10	60.66, 102.00	0.239	1.88	8.6	13.40	29.2
2-11	60.56, 107.50	0.095	1.56	8.1	12.14	18.1
average	60.6 ±0.1, 104 ±3	0.15 ±0.05				27 ±9

Values in the final row are the average ± standard deviation.

† All crystals belong to the space group $P6_3$

‡ $R_{sym} = \Sigma_{hkl}\Sigma_i| I_{hkl,i} - \langle I_{hkl}\rangle|/\Sigma_{hkl}\Sigma_i I_{hkl,i}$.

Table S3 Crystallographic statistics for datasets from crystals treated with Paratone-N.

crystal	a, c† (Å)	mosaicity (˚)	max resolution (Å)	R_{sym}‡(%)	$I/\sigma(I)$	Wilson-B (Å^2)
3-1	60.67, 102.70	0.291	2.19	9.8	12.11	31.7
3-2	60.80, 104.40	0.121	2.07	12.6	8.06	28.9
3-3	60.67, 106.23	0.093	1.89	13.9	7.26	26.7
3-4	60.73, 108.13	0.070	1.68	8.8	12.42	17.8
3-5	60.74, 107.27	0.100	1.75	13.0	7.13	29.4
3-6	60.70, 110.01	0.064	1.52	8.9	10.06	17.9
3-7	60.51, 108.04	0.062	1.77	16.7	7.56	20.0
3-8	60.64, 104.65	0.161	1.88	11.1	9.05	26.7
3-9	60.80, 105.96	0.215	1.89	10.8	10.04	28.3
3-10	60.72, 104.40	0.180	1.84	11.6	7.88	27.9
3-11	60.63, 107.44	0.119	1.86	11.8	9.43	32.9
3-12	60.75, 108.00	0.077	1.58	10.0	9.58	18.8
average	60.7 ±0.1, 106 ±2	0.13 ±0.07				26 ±6

Values in the final row are the average ± standard deviation.

† All crystals belong to the space group $P6_3$

‡ $R_{sym} = \Sigma_{hkl}\Sigma_i| I_{hkl,i} - \langle I_{hkl}\rangle|/\Sigma_{hkl}\Sigma_i I_{hkl,i}$.

Table S4 Crystallographic statistics for datasets from crystals with liquid paraffin.

crystal	a, c† (Å)	mosaicity (˚)	max resolution (Å)	R_{sym}‡(%)	$I/\sigma(I)$	Wilson-B (Å^2)
4-1	60.69, 101.56	0.236	1.82	7.7	15.21	27.4
4-2	60.85, 109.55	0.100	1.93	12.0	9.54	29.4
4-3	60.60, 104.12	0.217	2.03	13.9	8.06	27.3
4-4	60.66, 104.11	0.129	1.78	10.4	8.57	28.6
4-5	60.56, 109.08	0.097	1.78	9.3	11.34	22.8
4-6	60.80, 102.16	0.138	1.80	8.9	11.46	24.8
4-7	60.55, 102.17	0.172	1.94	8.4	13.66	29.4
4-8	60.74, 102.05	0.147	1.73	7.4	13.36	24.4
4-9	60.58, 107.93	0.123	1.59	8.2	11.88	21.6
4-10	60.69, 107.88	0.100	1.73	12.7	7.83	29.2
4-11	60.54, 107.13	0.126	1.64	9.8	9.89	20.9
average	60.7 ±0.1, 105 ±3	0.14 ±0.05				26 ±3

Values in the final row are the average ± standard deviation.

† All crystals belong to the space group $P6_3$

‡ $R_{sym} = \Sigma_{hkl}\Sigma_i| I_{hkl,i} - \langle I_{hkl}\rangle|/\Sigma_{hkl}\Sigma_i I_{hkl,i}$.

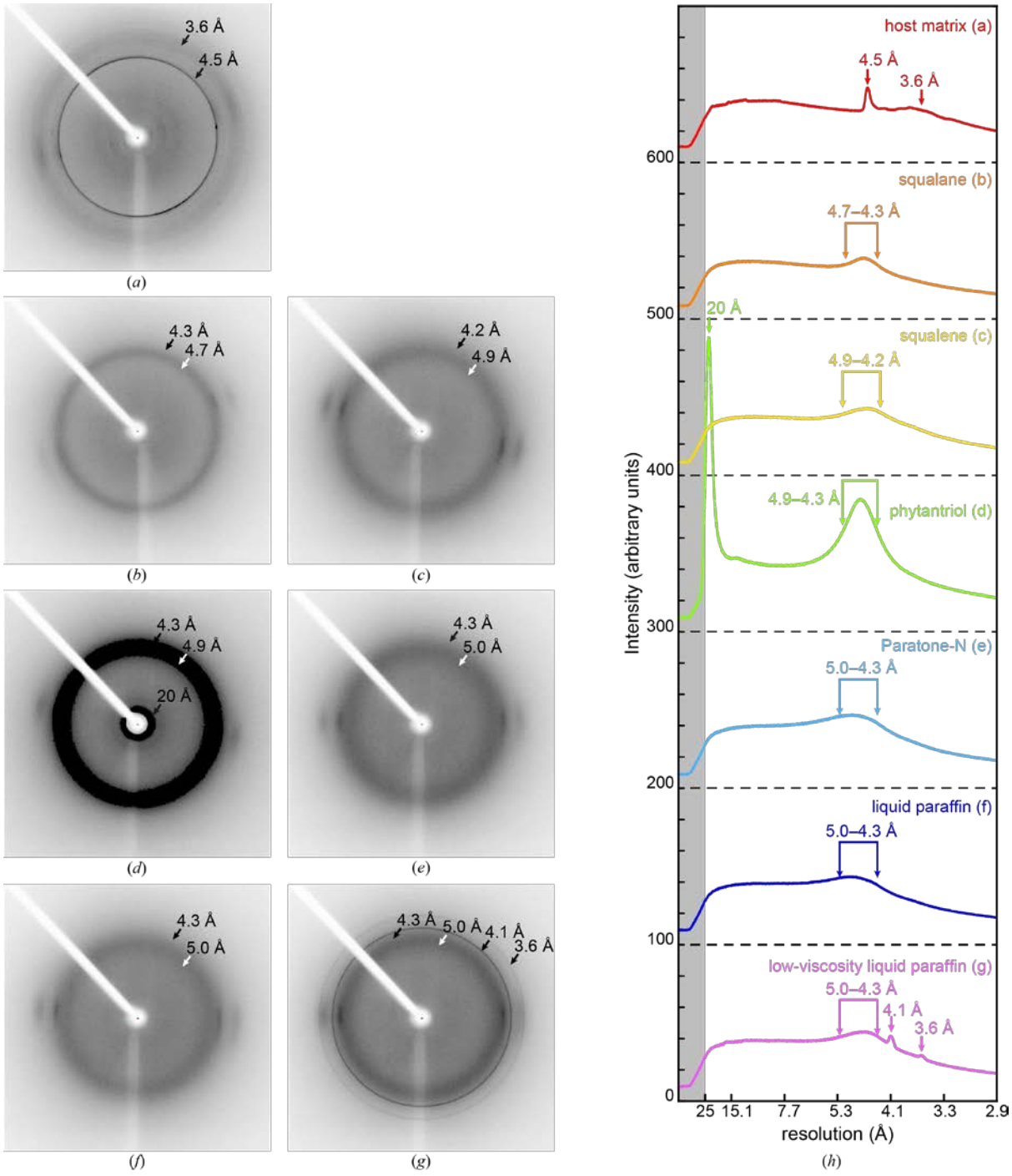

Figure S1 Background scattering. Diffraction images for (*a*) host matrix, (*b*) squalane, (*c*) squalene, (*d*) phytantriol, (*e*) Paratone-N, (*f*) liquid paraffin and (*g*) low-viscosity liquid paraffin are shown. The arrows indicate the resolutions. (*h*) Diffraction patterns plotted as intensity versus resolution for the respective oils. The intensity is circularly the averaged intensity at that resolution. The shaded region in the plot is corresponded to the beamstop shadow.

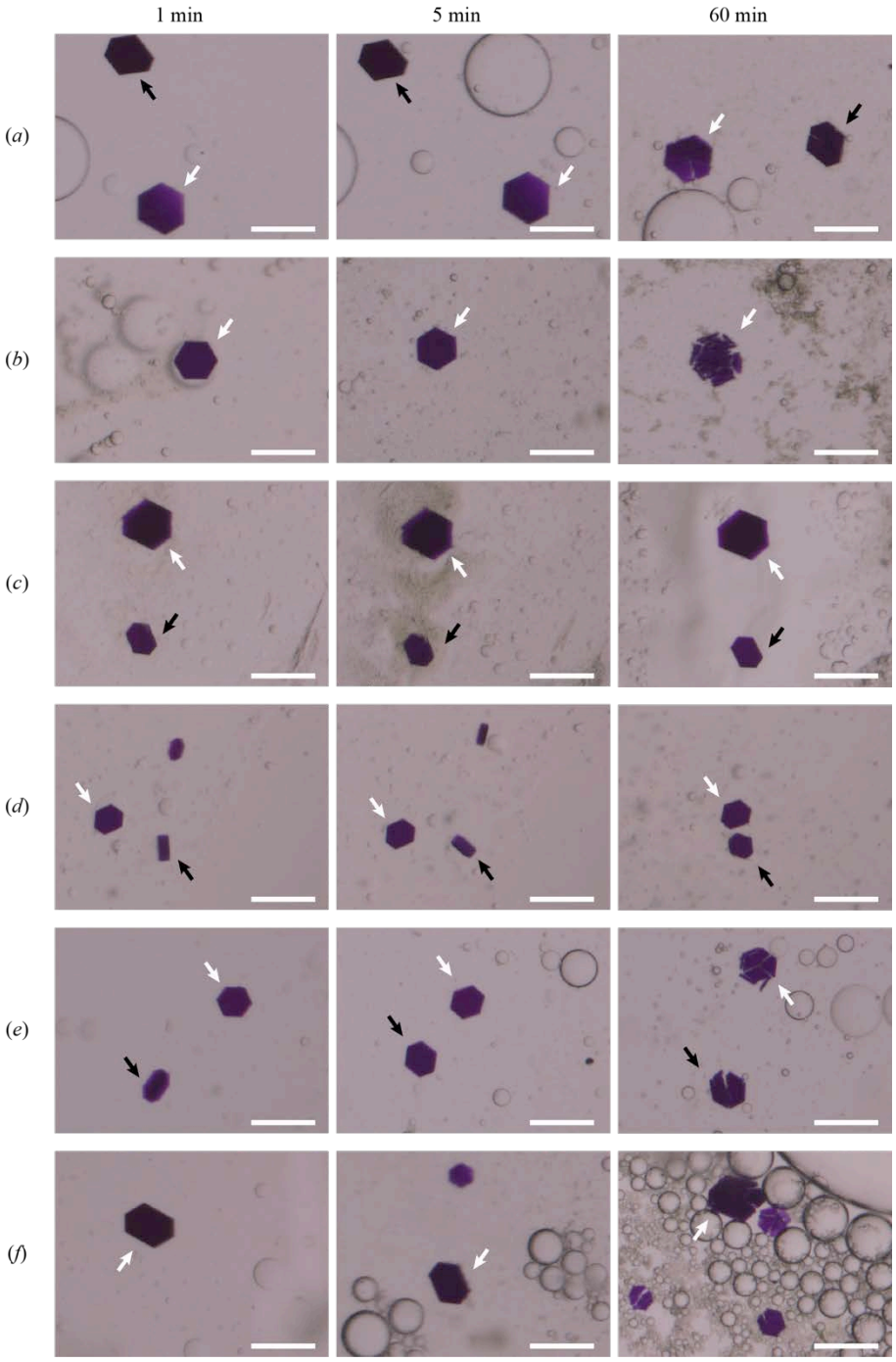

Figure S2 Stability of crystals in each oil in the step 3 of Fig. 1. The time sequence images of crystals in (*a*) squalane, (*b*) squalene, (*c*) phytantriol, (*d*) Paratone-N, (*e*) liquid paraffin and (*f*) low-viscosity liquid paraffin drops after 1min (left), 5 min (middle) and 60 min (right) after transferring the crystals to a drop of each of oils. The crystals were suspended in each of oil drops and thus the relative position of the crystals had been changed during the observation. The white and black arrows indicate the same crystals in each of oil drops. The scale bars indicate 0.1 mm.

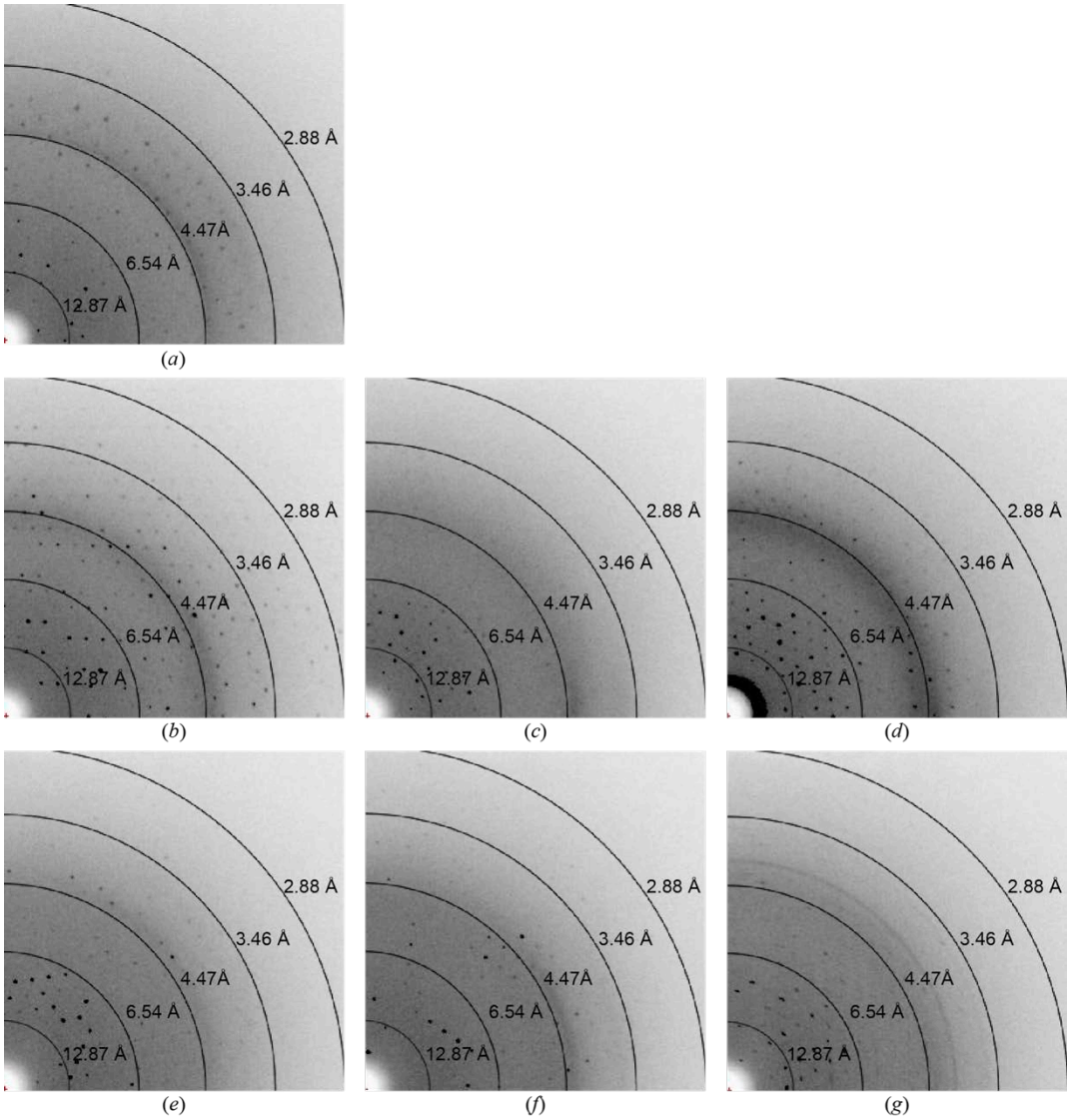

Figure S3 Diffraction experiment with an in-house X-ray source. Diffraction images for the bR crystals cryocooled with (*a*) host matrix, (*b*) squalane, (*c*) squalene, (*d*) phytantriol, (*e*) Paratone-N, (*f*) liquid paraffin and (*g*) low-viscosity liquid paraffin are shown. Images are magnified for clarity.

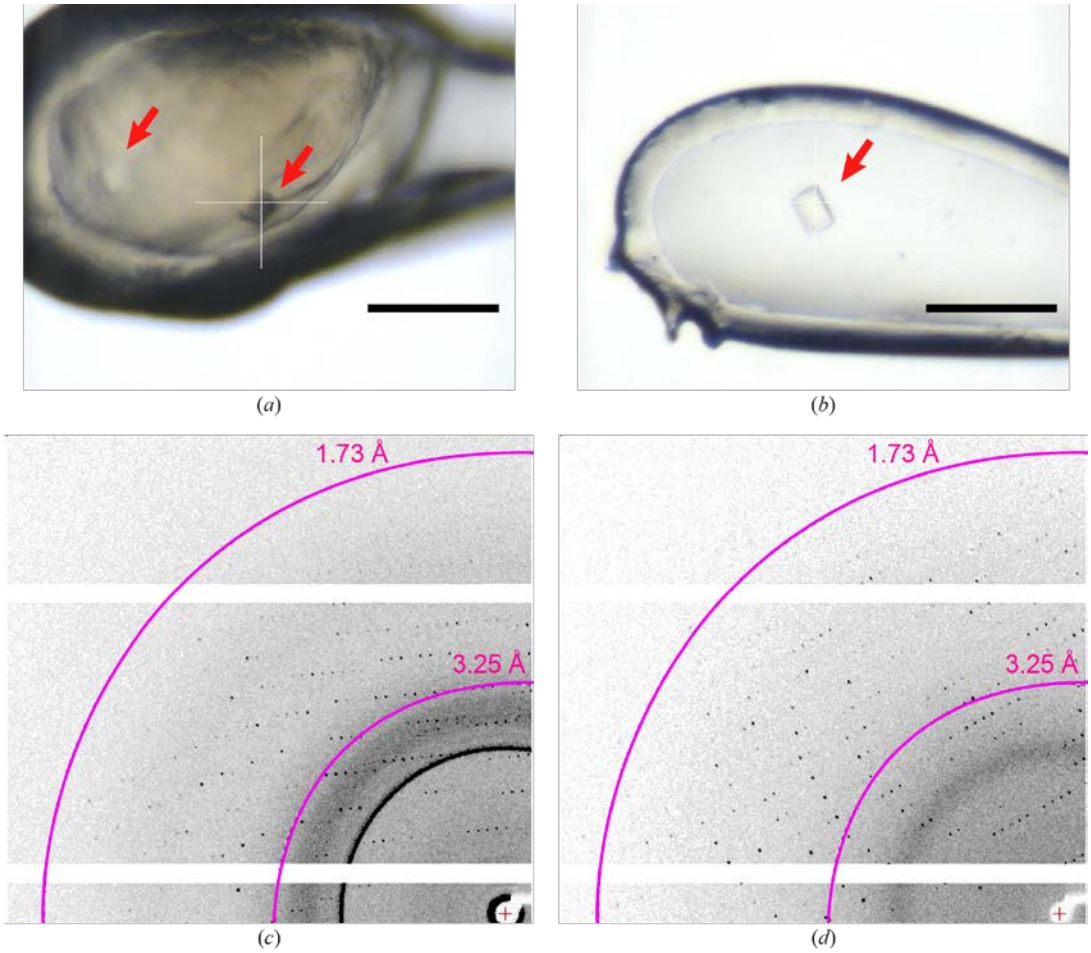

Figure S4 Application to colorless crystals. (*a*) The lysozyme crystals with host matrix. The crystals were prepared by the LCP method as described (Aherne *et al*., 2012) using lyophilized hen egg white lysozyme (Cat No. L6876, Sigma-Aldrich, St. Louis, MO, USA). Crystals of ~ 30 µm were flash-cooled without treatment. The red arrows indicate the crystal position. The scale bar indicates 0.1 mm. (*b*) The lysozyme crystal cleaned and flash-cooled with squalane. (*c*) The diffraction image of the crystal with host matrix. Diffraction experiment was performed at BL41XU of SPring-8. The experimental conditions were the same as those for the bR crystals described in section 2.4. The images were prepared by merging 5 consecutive diffraction images (corresponding to 1.0˚ rotation). (*d*) The diffraction image of the crystal with squalane.