

UL31⁽²²⁻⁴²⁾

Charge P/L	1/4	1/2	1/1	3/2	2/1
Molar P/L	1/140	1/70	1/35	3/70	2/35
Cubic	-----	<i>Im3m</i> : 46.08 nm <K> = 5.05e-3 nm ⁻²	<i>Pn3m</i> : 24.20 nm <K> = 1.12e-2 nm ⁻²	<i>Pn3m</i> : 21.04 nm <K> = 1.48e-2 nm ⁻²	<i>Pn3m</i> : 19.54 nm <K> = 1.72e-2 nm ⁻²
Hexagonal	-----	-----	-----	-----	-----
Lamellar	-----	7.17 nm	6.43 nm	6.26 nm	6.20 nm

UL31⁽⁴¹⁻⁵⁰⁾

Charge P/L	1/4	1/2	1/1	3/2	2/1
Molar P/L	1/80	1/40	1/20	3/40	1/10
Cubic	-----	-----	-----	<i>Pn3m</i> : 26.09 nm <K> = 9.62e-3 nm ⁻²	<i>Pn3m</i> : 23.73 nm <K> = 1.16e-2 nm ⁻²
Hexagonal	-----	-----	7.98 nm	-----	-----
Lamellar	-----	-----	-----	-----	-----

UL34⁽¹⁷⁴⁻¹⁹⁴⁾

Charge P/L	1/4	1/2	1/1	3/2	2/1
Molar P/L	1/140	1/70	1/35	3/70	2/35
Cubic	-----	<i>Im3m</i> : 24.41 nm <K> = 1.80e-2 nm ⁻²	<i>Pn3m</i> : 17.26 nm <K> = 2.20e-2 nm ⁻²	<i>Pn3m</i> : 14.28 nm <K> = 3.21e-2 nm ⁻²	-----
Hexagonal	-----	-----	-----	-----	-----
Lamellar	7.92 nm	6.86 nm	6.07 nm	6.00 nm	6.02 nm

UL31⁽²²⁻⁴²⁾ / UL34⁽¹⁷⁴⁻¹⁹⁴⁾

UL31 ⁽²²⁻⁴²⁾	Molar P/L = 1/35	Molar P/L = 3/70
UL34 ⁽¹⁷⁴⁻¹⁹⁴⁾	Molar P/L = 1/35	Molar P/L = 3/70
Cubic	<i>Pn3m</i> : 15.91 nm <K> = 2.59e-2 nm ⁻²	<i>Pn3m</i> : 14.28 nm <K> = 3.21e-2 nm ⁻²
Hexagonal	-----	-----
Lamellar	6.02 nm	6.00 nm

UL31⁽⁴¹⁻⁵⁰⁾ / UL34⁽¹⁷⁴⁻¹⁹⁴⁾

UL31 ⁽⁴¹⁻⁵⁰⁾	Molar P/L = 1/40	Molar P/L = 1/20
UL34 ⁽¹⁷⁴⁻¹⁹⁴⁾	Molar P/L = 1/35	Molar P/L = 3/70
Cubic	<i>Pn3m</i> : 16.70 nm <K> = 2.35e-2 nm ⁻²	<i>Pn3m</i> : 14.28 nm <K> = 3.21e-2 nm ⁻²
Hexagonal	-----	-----
Lamellar	6.02 nm	5.97 nm

Supplementary Fig. S4. Phase diagram with tabulated lattice parameters and negative Gaussian curvature values for each SAXS condition. Cells containing dashed lines indicate that the phase was either not present or could not be indexed due to insufficient number of reflections.