Table S1. Fractional atomic coordinates and isotropic or equivalent isotropic displacement parameters (Å^2) of $Ba_2LiGa(P_2O_7)_2$

	x	*y*	*z*	U_{iso}*/U_{eq}
Li1	0.3793 (19)	0.0992 (18)	0.3250 (16)	0.026 (3)
Ba1	0.91307 (5)	0.01699 (5)	0.21993 (4)	0.00840 (12)
Ba2	0.07552 (5)	0.51094 (5)	0.26200 (4)	0.00956 (12)
Ga1	0.60706 (9)	0.43480 (9)	0.23717 (8)	0.00584 (17)
P1	0.8171 (2)	0.2192 (2)	0.51212 (18)	0.0066 (3)
P2	0.4407 (2)	0.2797 (2)	0.57618 (18)	0.0061 (3)
P3	0.7778 (2)	0.7261 (2)	−0.00288 (18)	0.0060 (3)
P4	0.4009 (2)	0.7462 (2)	0.02820 (19)	0.0065 (3)
O1	0.8168 (6)	0.0377 (6)	0.5601 (5)	0.0108 (10)
O2	0.8061 (6)	0.2911 (6)	0.3368 (5)	0.0089 (10)
O3	0.9713 (6)	0.2829 (6)	0.5579 (5)	0.0096 (10)
O4	0.6424 (6)	0.2992 (6)	0.5942 (5)	0.0071 (9)
O5	0.4071 (6)	0.1036 (6)	0.6448 (5)	0.0110 (10)
O6	0.3333 (6)	0.4031 (6)	0.6539 (5)	0.0085 (10)
O7	0.4271 (6)	0.3305 (6)	0.4009 (5)	0.0092 (10)
O8	0.7813 (6)	0.5380 (5)	0.0695 (5)	0.0078 (9)
O9	0.9091 (6)	0.7926 (6)	0.0648 (5)	0.0105 (10)
O10	0.8077 (6)	0.7673 (6)	−0.1755 (5)	0.0104 (10)
O11	0.5835 (6)	0.8115 (6)	0.0383 (5)	0.0080 (9)
O12	0.4111 (6)	0.5698 (6)	0.1368 (5)	0.0081 (10)
O13	0.2474 (6)	0.8549 (6)	0.0744 (5)	0.0114 (10)
O14	0.4042 (6)	0.7420 (6)	−0.1399 (5)	0.0105 (10)

Table S2. Atomic displacement parameters (Å^2) of compound $Ba_2LiGa(P_2O_7)_2$

	U^{11}	U^{22}	U^{33}	U^{12}	U^{13}	U^{23}
Li1	0.023 (8)	0.023 (8)	0.025 (7)	−0.009 (6)	−0.006 (6)	0.010 (6)
Ba1	0.0089 (2)	0.0074 (2)	0.0092 (2)	−0.00092 (15)	−0.00205 (15)	−0.00226 (15)
Ba2	0.0088 (2)	0.0097 (2)	0.0110 (2)	−0.00171 (15)	−0.00063 (15)	−0.00385 (15)
Ga1	0.0051 (4)	0.0060 (4)	0.0059 (3)	−0.0008 (3)	−0.0017 (3)	−0.0001 (3)
P1	0.0064 (8)	0.0072 (8)	0.0055 (8)	0.0002 (6)	−0.0007 (6)	−0.0009 (6)
P2	0.0057 (8)	0.0062 (8)	0.0065 (8)	−0.0016 (6)	−0.0008 (6)	−0.0013 (6)
P3	0.0049 (8)	0.0064 (8)	0.0068 (8)	−0.0008 (6)	−0.0004 (6)	−0.0021 (6)
P4	0.0060 (8)	0.0064 (8)	0.0067 (8)	−0.0010 (6)	−0.0029 (6)	0.0000 (6)
O1	0.013 (3)	0.007 (2)	0.012 (2)	−0.0018 (19)	0.0007 (19)	−0.0034 (19)
O2	0.009 (2)	0.014 (3)	0.005 (2)	0.001 (2)	−0.0035 (18)	−0.0036 (18)
O3	0.009 (2)	0.012 (2)	0.009 (2)	−0.0052 (19)	−0.0054 (18)	−0.0015 (19)
O4	0.004 (2)	0.013 (2)	0.004 (2)	0.0000 (18)	−0.0029 (17)	−0.0019 (18)
O5	0.012 (3)	0.003 (2)	0.017 (2)	−0.0004 (19)	0.000 (2)	−0.0023 (19)

O6	0.011 (3)	0.007 (2)	0.008 (2)	0.0009 (19)	0.0005 (18)	−0.0033 (18)
O7	0.009 (2)	0.014 (2)	0.007 (2)	−0.004 (2)	0.0005 (18)	−0.0046 (19)
O8	0.009 (2)	0.004 (2)	0.009 (2)	−0.0033 (18)	−0.0012 (18)	0.0017 (17)
O9	0.007 (2)	0.013 (3)	0.013 (2)	−0.005 (2)	0.0001 (19)	−0.0047 (19)
O10	0.010 (3)	0.010 (2)	0.010 (2)	−0.0002 (19)	−0.0016 (19)	−0.0021 (19)
O11	0.008 (2)	0.008 (2)	0.009 (2)	0.0002 (18)	−0.0030 (18)	−0.0030 (18)
O12	0.009 (2)	0.009 (2)	0.007 (2)	−0.0052 (19)	−0.0016 (18)	0.0008 (18)
O13	0.003 (2)	0.017 (3)	0.013 (2)	0.0019 (19)	0.0001 (18)	−0.004 (2)
O14	0.014 (3)	0.007 (2)	0.011 (2)	0.0006 (19)	−0.0052 (19)	−0.0028 (19)

Table S3. Selected Interatomic Distances (Å) and Angles (°) of $Ba_2LiGa(P_2O_7)_2$

Li1—O1^{i}	2.021 (13)	*Ba2—O8^{ii}*	*3.194 (4)*
Li1—O10^{ii}	2.088 (15)	*Ba2—O13*	*3.299 (4)*
Li1—O5^{i}	2.177 (16)	Ga1—O12	1.914 (5)
Li1—O7	2.355 (15)	Ga1—O2	1.956 (5)
Li1—O14^{ii}	2.451 (13)	Ga1—O14^{ii}	1.970 (5)
Ba1—O9^{iii}	2.688 (5)	Ga1—O8	1.976 (4)
Ba1—O5^{i}	2.782 (4)	Ga1—O7	1.988 (4)
Ba1—O2	2.806 (5)	Ga1—O6^{vii}	2.046 (4)
Ba1—O3^{iv}	2.879 (5)	P1—O1	1.482 (5)
Ba1—O9^{v}	2.917 (4)	P1—O3	1.517 (4)
Ba1—O10^{v}	2.926 (4)	P1—O2	1.551 (4)
Ba1—O13^{ii}	2.955 (4)	P1—O4	1.599 (5)
Ba1—O14^{ii}	2.962 (5)	P2—O5	1.496 (5)
Ba1—O1^{iv}	2.967 (5)	P2—O6	1.514 (5)
Ba1—O13^{vi}	*3.044 (5)*	P2—O7	1.547 (4)
Ba1—O1	*3.140 (5)*	P2—O4	1.607 (4)
Ba2—O3^{vii}	2.685 (5)	P3—O9	1.496 (4)
Ba2—O10^{ii}	2.699 (5)	P3—O10	1.505 (5)
Ba2—O12	2.714 (4)	P3—O8	1.547 (4)
Ba2—O9^{viii}	2.806 (5)	P3—O11	1.599 (5)
Ba2—O2^{viii}	2.866 (4)	P4—O13	1.475 (5)
Ba2—O3^{viii}	2.928 (4)	P4—O14	1.541 (5)
Ba2—O8^{viii}	2.977 (4)	P4—O12	1.544 (5)
Ba2—O7	*3.125 (5)*	P4—O11	1.597 (5)
Ba2—O6^{ix}	*3.139 (5)*		
O1^{i}—Li1—O10^{ii}	86.7 (6)	O3—P1—O2	109.1 (2)
O1^{i}—Li1—O5^{i}	96.1 (6)	O1—P1—O4	108.3 (3)
O10^{ii}—Li1—O5^{i}	142.9 (8)	O3—P1—O4	105.1 (3)
O1^{i}—Li1—O7	119.4 (7)	O2—P1—O4	106.3 (3)
O10^{ii}—Li1—O7	93.7 (6)	O5—P2—O6	115.9 (3)
O5^{i}—Li1—O7	116.1 (6)	O5—P2—O7	110.5 (3)

O1^{i}—Li1—O14^{ii}	168.5 (8)	O6—P2—O7	112.2 (3)
O10^{ii}—Li1—O14^{ii}	85.2 (5)	O5—P2—O4	109.5 (3)
O5^{i}—Li1—O14^{ii}	85.5 (5)	O6—P2—O4	102.8 (3)
O7—Li1—O14^{ii}	69.4 (4)	O7—P2—O4	105.1 (2)
O12—Ga1—O14^{ii}	92.74 (19)	O9—P3—O10	112.5 (3)
O2—Ga1—O14^{ii}	85.37 (19)	O9—P3—O8	109.9 (3)
O12—Ga1—O8	91.95 (18)	O10—P3—O8	111.4 (3)
O2—Ga1—O8	88.22 (18)	O9—P3—O11	108.1 (3)
O14^{ii}—Ga1—O8	91.34 (19)	O10—P3—O11	106.6 (3)
O12—Ga1—O7	86.78 (18)	O8—P3—O11	108.2 (2)
O2—Ga1—O7	93.01 (19)	O13—P4—O14	112.3 (3)
O14^{ii}—Ga1—O7	87.44 (19)	O13—P4—O12	112.4 (3)
O12—Ga1—O6^{vii}	97.68 (19)	O14—P4—O12	110.6 (3)
O2—Ga1—O6^{vii}	84.22 (18)	O13—P4—O11	110.6 (3)
O1—P1—O3	115.6 (3)	O14—P4—O11	105.7 (2)
O1—P1—O2	111.8 (3)	O12—P4—O11	104.8 (2)
Symmetry codes: (i) −*x*+1, −*y*, −*z*+1; (ii) −*x*+1, −*y*+1, −*z*; (iii) *x*, *y*−1, *z*; (iv) −*x*+2, −*y*, −*z*+1; (v) −*x*+2, −*y*+1, −*z*; (vi) *x*+1, *y*−1, *z*; (vii) −*x*+1, −*y*+1, −*z*+1; (viii) *x*−1, *y*, *z*; (ix) −*x*, −*y*+1, −*z*+1.			