

Supporting Information

2D-layered perovskite $\text{ALaTa}_2\text{O}_7\text{:Bi}^{3+}$ (A = K and Na) phosphors with versatile structures and tunable photoluminescence

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Table. S1 Fractional atomic coordinates and isotropic displacement parameters ($\text{\AA}^2$) of $\text{Na}(\text{La}_{0.98}\text{Bi}_{0.02})\text{Ta}_2\text{O}_7 \cdot 1.38\text{H}_2\text{O}$, $\text{K}(\text{La}_{0.98}\text{Bi}_{0.02})\text{Ta}_2\text{O}_7$ and $\text{Rb}(\text{La}_{0.98}\text{Bi}_{0.02})\text{Ta}_2\text{O}_7$.

	<i>x</i>	<i>y</i>	<i>z</i>	<i>B</i> _{iso}	Occ.
$\text{Na}(\text{La}_{0.98}\text{Bi}_{0.02})\text{Ta}_2\text{O}_7 \cdot 1.38\text{H}_2\text{O}$					
Na	0	0	0.2092 (7)	1.7 (4)	0.5
La	0	0	0	1.00 (9)	0.98
Bi	0	0	0	1.00 (9)	0.02
Ta	0	0	0.41286 (5)	0.47 (8)	1
O1	0	0	0.5	0.48 (17)	1
O2	0	0.5	0.0719 (3)	0.48 (17)	1
O3	0	0	0.3454 (5)	0.48 (17)	1
O4	0	0.5	0.2879 (9)	0.48 (17)	0.346 (15)
$\text{K}(\text{La}_{0.98}\text{Bi}_{0.02})\text{Ta}_2\text{O}_7$					
K	0	0.2338 (4)	0	0.6 (2)	0.5
La	0	0	0	0.50 (9)	0.98
Bi	0	0	0	0.50 (9)	0.02
Ta	0	0.39668 (5)	0.5	0.24 (8)	1
O1	0.5	0	0.5	0.67 (15)	1
O2	0	0.0854 (5)	0.5	0.67 (15)	1
O3	0	0.3167 (6)	0.5	0.67 (15)	1
O4	0	0.4131 (6)	0	0.67 (15)	1
$\text{Rb}(\text{La}_{0.98}\text{Bi}_{0.02})\text{Ta}_2\text{O}_7$					
Rb	0.5	0.5	0.5	2.43 (10)	1
La	0.5	0.5	0	0.55 (8)	0.98
Bi	0.5	0.5	0	0.55 (8)	0.02
Ta	0	0	0.20526 (9)	0.32 (7)	1
O1	0	0	0	1.52 (19)	1
O2	0	0.5	0.1679 (8)	1.52 (19)	1
O3	0	0	0.3590 (12)	1.52 (19)	1

Table. S2 The representative bond lengths (Å) of Na(La_{0.98}Bi_{0.02})Ta₂O₇*1.38H₂O, K(La_{0.98}Bi_{0.02})Ta₂O₇ and Rb(La_{0.98}Bi_{0.02})Ta₂O₇.

Na(La_{0.98}Bi_{0.02})Ta₂O₇*1.38H₂O			
Na—O4	2.82 (2)	Ta—O1	2.2494 (12)
Na—O4 ⁱ	1.9494 (12)	Ta—O2 ⁱ	1.9872 (17)
(La/Bi)—O1 ⁱ	2.7548 (1)	Ta—O3	1.741 (13)
(La/Bi)—O2	2.691 (6)		
K(La_{0.98}Bi_{0.02})Ta₂O₇			
K—O3	2.658 (11)	Ta—O1 ⁱⁱ	2.2628 (11)
K—O3 ⁱ	2.966 (6)	Ta—O2 ⁱⁱ	1.989 (2)
(La/Bi)—O1	2.7517 (1)	Ta—O3	1.752 (13)
(La/Bi)—O2	2.696 (8)	Ta—O4	1.975 (2)
(La/Bi)—O4 ⁱ	2.725 (9)		
Rb(La_{0.98}Bi_{0.02})Ta₂O₇			
Rb—O3	3.160 (7)	Ta—O1	2.2789 (10)
(La/Bi)—O1	2.7452 (1)	Ta—O2	1.9850 (18)
(La/Bi)—O2	2.691 (6)	Ta—O3	1.707 (13)

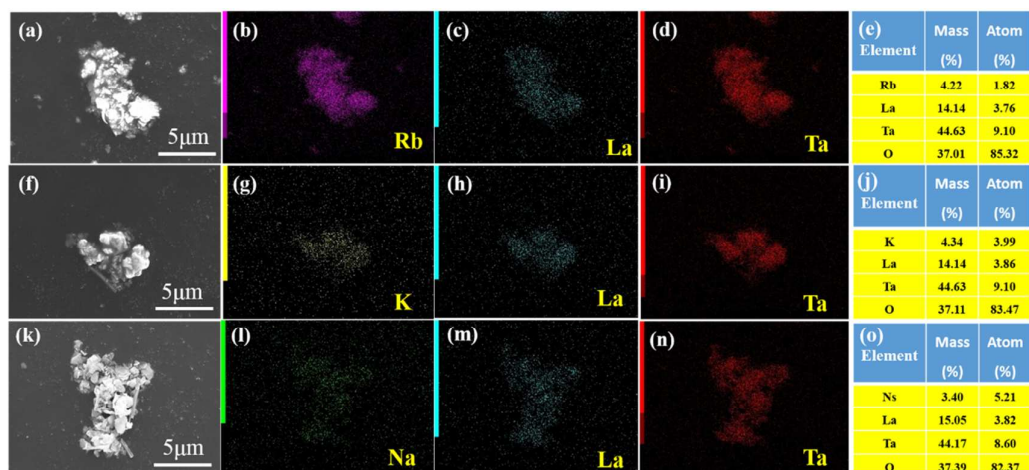


Figure. S1 Element mapping images of Rb, K, Na, La and Ta and EDS composition analysis for the selected $\text{AlLaTa}_2\text{O}_7:0.02\text{Bi}^{3+}$ ($A = \text{Rb, K and Na}$) phosphors.