Electronic Supplementary Material (ESI) for Journal of Materials Chemistry C.

Table S1. Fractional atomic coordinates and isotropic or equivalent isotropic displacement parameters (Å^2) of $K_5REE(P_2O_7)_2$ (REE=Y, Eu, Tb).

$K_5Y(P_2O_7)_2$	*x*	*y*	*z*	U_{iso}*/U_{eq}
K1	0.01132 (11)	0.63096 (7)	0.27435 (4)	0.02500 (18)
K2	0.40139 (12)	0.39647 (7)	0.22021 (5)	0.0284 (2)
K3	−0.15400 (11)	0.88382 (6)	0.50840 (4)	0.02022 (17)
K4	−0.33589 (11)	0.12733 (7)	−0.00582 (4)	0.02377 (18)
K5	−0.74332 (10)	0.40659 (7)	0.01942 (4)	0.02124 (17)
K6	0.45171 (13)	0.85122 (7)	0.24623 (5)	0.0332 (2)
K7	0.03046 (11)	0.15365 (6)	0.25445 (4)	0.02362 (18)
K8	0.22439 (10)	0.60935 (6)	0.47620 (4)	0.01984 (17)
K9	0.62839 (9)	0.63013 (6)	0.38383 (4)	0.01580 (15)
K10	−0.13926 (9)	0.38148 (6)	0.13010 (4)	0.01664 (15)
Y1	−0.38803 (4)	0.13282 (2)	0.38279 (2)	0.00729 (8)
Y2	−0.13658 (4)	0.88339 (2)	0.11906 (2)	0.00771 (8)
P1	0.18154 (11)	0.66568 (7)	0.10358 (5)	0.01095 (17)
P2	0.34022 (11)	0.32614 (7)	0.39698 (5)	0.01007 (17)
P3	−0.45755 (10)	0.09365 (7)	0.16778 (4)	0.00897 (16)
P4	0.57802 (11)	0.62780 (7)	0.14681 (5)	0.00961 (16)
P5	−0.06581 (10)	0.91474 (7)	0.33425 (4)	0.00833 (16)
P6	−0.05280 (10)	0.37639 (7)	0.36167 (5)	0.00894 (16)
P7	0.30910 (10)	0.87845 (7)	0.40921 (4)	0.00721 (16)
P8	0.17043 (10)	0.13222 (7)	0.09000 (4)	0.00755 (16)
O1	0.1560 (3)	0.25337 (18)	0.12303 (13)	0.0161 (5)
O2	−0.0738 (3)	0.49257 (17)	0.40142 (12)	0.0139 (5)
O3	0.5563 (3)	0.7301 (2)	0.53285 (13)	0.0206 (5)
O4	−0.0201 (3)	0.38215 (19)	0.28016 (12)	0.0196 (5)
O5	−0.2750 (3)	0.71078 (19)	0.12354 (14)	0.0229 (6)
O6	−0.1288 (3)	0.68356 (18)	0.59013 (12)	0.0143 (5)
O7	−0.4369 (3)	0.51230 (18)	0.10263 (12)	0.0154 (5)
O8	0.2500 (3)	0.87637 (18)	0.48840 (12)	0.0130 (5)
O9	−0.3870 (3)	0.98908 (18)	0.12510 (12)	0.0136 (5)
O10	0.5960 (4)	0.6210 (2)	0.23186 (13)	0.0297 (6)
O11	−0.4053 (3)	0.20922 (19)	0.13910 (13)	0.0191 (5)
O12	0.1478 (3)	0.55999 (19)	0.14756 (14)	0.0240 (6)
O13	−0.2282 (3)	0.87340 (19)	−0.01069 (12)	0.0168 (5)
O14	0.5797 (3)	1.08232 (19)	0.25417 (12)	0.0162 (5)
O15	−0.1430 (3)	1.01969 (18)	0.37231 (12)	0.0135 (5)
O16	0.3607 (3)	0.24206 (18)	0.32930 (12)	0.0149 (5)
O17	−0.1299 (4)	0.3498 (2)	−0.01882 (14)	0.0376 (7)
O18	0.0016 (3)	0.05396 (18)	0.09436 (12)	0.0144 (5)
O19	0.1515 (3)	0.94575 (18)	0.35486 (12)	0.0123 (5)
O20	−0.2018 (3)	0.28569 (19)	0.37393 (13)	0.0174 (5)

O21	0.1130 (3)	0.78032 (19)	0.13495 (15)	0.0274 (6)
O22	−0.0989 (3)	0.91586 (19)	0.24700 (12)	0.0167 (5)
O23	0.3989 (3)	0.7004 (2)	0.11720 (15)	0.0251 (6)
O24	0.3880 (3)	0.45203 (19)	0.38678 (15)	0.0245 (6)
O25	0.3237 (3)	0.76054 (17)	0.37080 (12)	0.0135 (5)
O26	0.3235 (3)	0.06791 (18)	0.14734 (12)	0.0142 (5)
O27	−0.1125 (3)	0.80014 (18)	0.36637 (13)	0.0170 (5)
O28	0.4726 (3)	0.96226 (18)	0.40641 (12)	0.0141 (5)
$K_5Eu(P_2O_7)_2$	*x*	*y*	*z*	U_{iso}*/U_{eq}
K1	0.2956 (3)	0.5623 (2)	0.38238 (17)	0.0425 (6)
K2	0.2444 (2)	0.24697 (19)	0.62682 (14)	0.0198 (4)
K3	0.7507 (3)	0.04211 (19)	0.60584 (15)	0.0244 (4)
K4	0.8398 (2)	0.01166 (19)	0.11869 (15)	0.0223 (4)
K5	0.7225 (3)	0.4945 (2)	0.15006 (15)	0.0254 (4)
Eu1	0.26830 (5)	0.23221 (4)	0.13022 (3)	0.01036 (13)
P1	0.4031 (2)	0.8182 (2)	0.12696 (16)	0.0101 (4)
P2	0.1100 (3)	0.6630 (2)	0.09006 (16)	0.0115 (4)
P3	0.9133 (3)	0.2811 (2)	0.37781 (16)	0.0118 (4)
P4	0.5569 (3)	0.2116 (2)	0.32644 (16)	0.0129 (4)
O1	−0.0039 (7)	0.7494 (5)	−0.0146 (4)	0.0158 (11)
O2	0.0332 (7)	0.7198 (6)	0.2048 (4)	0.0209 (12)
O3	0.1583 (7)	0.4910 (5)	0.0806 (4)	0.0193 (12)
O4	0.3130 (7)	0.6997 (5)	0.0647 (4)	0.0151 (11)
O5	0.2555 (7)	0.9723 (5)	0.1256 (4)	0.0132 (10)
O6	0.5688 (7)	0.8171 (6)	0.0443 (4)	0.0180 (11)
O7	0.4615 (7)	0.7495 (5)	0.2461 (4)	0.0149 (11)
O8	0.5256 (7)	0.0699 (6)	0.2753 (5)	0.0234 (13)
O9	0.4677 (7)	0.3446 (6)	0.2391 (4)	0.0168 (11)
O10	0.4993 (8)	0.2367 (7)	0.4504 (4)	0.0261 (13)
O11	0.7823 (7)	0.1854 (6)	0.3164 (4)	0.0193 (12)
O12	0.8009 (8)	0.4451 (6)	0.3810 (5)	0.0225 (12)
O13	1.0764 (7)	0.2545 (6)	0.2905 (4)	0.0219 (12)
O14	0.9706 (7)	0.2023 (6)	0.4944 (4)	0.0181 (11)
$K_5Tb(P_2O_7)_2$	*x*	*y*	*z*	U_{iso}*/U_{eq}
K1	0.2513 (2)	0.04367 (16)	0.10704 (13)	0.0233 (3)
K2	0.2074 (3)	0.43855 (19)	0.11776 (15)	0.0419 (5)
K3	0.74535 (19)	0.24544 (17)	0.12685 (13)	0.0191 (3)
K4	0.2218 (2)	0.49369 (16)	0.64871 (13)	0.0235 (3)
K5	0.3385 (2)	0.01301 (16)	0.61874 (13)	0.0212 (3)
Tb1	0.76682 (4)	0.23314 (3)	0.63000 (3)	0.00926 (10)
P1	0.0958 (2)	0.18172 (17)	0.37505 (14)	0.0086 (3)

P2	0.3919 (2)	0.33562 (18)	0.40901 (14)	0.0103 (3)
P3	0.0571 (2)	0.21211 (19)	0.82628 (14)	0.0130 (3)
P4	0.4149 (2)	0.28157 (18)	0.87624 (14)	0.0112 (3)
O1	0.0366 (6)	0.2514 (5)	0.2552 (4)	0.0141 (9)
O2	−0.0689 (6)	0.1842 (5)	0.4584 (4)	0.0171 (10)
O3	0.2418 (6)	0.0259 (5)	0.3757 (4)	0.0139 (9)
O4	0.1908 (6)	0.2982 (5)	0.4373 (4)	0.0156 (10)
O5	0.4679 (6)	0.2766 (5)	0.2927 (4)	0.0188 (10)
O6	0.3434 (6)	0.5084 (4)	0.4163 (4)	0.0169 (10)
O7	0.5082 (6)	0.2506 (5)	0.5138 (4)	0.0145 (9)
O8	0.0264 (6)	0.0681 (5)	0.7764 (4)	0.0266 (12)
O9	0.0002 (6)	0.2408 (6)	0.9509 (4)	0.0272 (12)
O10	−0.0338 (6)	0.3430 (5)	0.7383 (4)	0.0172 (10)
O11	0.2822 (6)	0.1882 (5)	0.8142 (4)	0.0190 (10)
O12	0.4714 (6)	0.2020 (5)	0.9933 (4)	0.0153 (10)
O13	0.3040 (7)	0.4460 (5)	0.8803 (4)	0.0232 (11)
O14	0.5787 (6)	0.2540 (5)	0.7884 (4)	0.0206 (10)

Table S2. Atomic displacement parameters (Å^2) of $K_5REE(P_2O_7)_2$ (REE=Y, Eu, Tb).

$K_5Y(P_2O_7)_2$	U^{11}	U^{22}	U^{33}	U^{12}	U^{13}	U^{23}
K1	0.0372 (5)	0.0188 (4)	0.0210 (4)	−0.0019(3)	0.0126(4)	−0.0026 (3)
K2	0.0450 (5)	0.0209 (4)	0.0179 (4)	−0.0119(4)	0.0025(4)	0.0040 (3)
K3	0.0328 (4)	0.0141 (4)	0.0152 (4)	−0.0018 (3)	0.0088 (3)	0.0010 (3)
K4	0.0337 (5)	0.0205 (4)	0.0171 (4)	−0.0030 (3)	0.0042 (3)	0.0041 (3)
K5	0.0269 (4)	0.0206 (4)	0.0163 (4)	−0.0067 (3)	0.0063 (3)	−0.0034 (3)
K6	0.0649 (6)	0.0171 (4)	0.0214 (4)	−0.0068 (4)	0.0216 (4)	−0.0036 (3)
K7	0.0403 (5)	0.0144 (4)	0.0166 (4)	−0.0052 (3)	0.0078 (3)	−0.0024 (3)
K8	0.0236 (4)	0.0205 (4)	0.0158 (4)	−0.0080 (3)	0.0074 (3)	−0.0042 (3)
K9	0.0141 (3)	0.0155 (4)	0.0183 (4)	0.0004 (3)	0.0041 (3)	0.0009 (3)
K10	0.0163 (4)	0.0195 (4)	0.0142 (4)	0.0047 (3)	0.0016 (3)	0.0010 (3)
Y1	0.00734(14)	0.00753(14)	0.00686(15)	0.00011 (11)	0.00084 (11)	−0.00045(11)
Y2	0.00839(15)	0.00835 (15)	0.00632 (15)	0.00038 (11)	0.00108 (11)	−0.00041 (11)
P1	0.0099 (4)	0.0107 (4)	0.0121 (4)	0.0012 (3)	0.0010 (3)	0.0010 (3)
P2	0.0094 (4)	0.0087 (4)	0.0125 (4)	0.0008 (3)	0.0027 (3)	0.0006 (3)
P3	0.0080 (4)	0.0112 (4)	0.0075 (4)	0.0023 (3)	0.0000 (3)	−0.0003 (3)
P4	0.0095 (4)	0.0081 (4)	0.0110 (4)	−0.0002 (3)	0.0012 (3)	0.0002 (3)
P5	0.0085 (4)	0.0101 (4)	0.0062 (4)	0.0018 (3)	0.0004 (3)	−0.0007 (3)
P6	0.0096 (4)	0.0079 (4)	0.0095 (4)	0.0006 (3)	0.0017 (3)	0.0007 (3)
P7	0.0071 (4)	0.0080 (4)	0.0065 (4)	−0.0001 (3)	0.0009 (3)	0.0001 (3)
P8	0.0078 (4)	0.0082 (4)	0.0066 (4)	−0.0001 (3)	0.0009 (3)	−0.0002 (3)
O1	0.0153 (12)	0.0119 (11)	0.0206 (13)	0.0019 (9)	0.0024 (10)	−0.0047 (9)
O2	0.0144 (11)	0.0095 (11)	0.0178 (12)	0.0027 (9)	0.0023 (9)	−0.0027 (9)

O3	0.0132 (12)	0.0324 (14)	0.0152 (12)	0.0015 (10)	−0.0024 (10)	0.0042 (11)
O4	0.0306 (14)	0.0192 (12)	0.0098 (12)	0.0014 (10)	0.0053 (10)	0.0008 (10)
O5	0.0237 (13)	0.0168 (12)	0.0296 (15)	−0.0087 (10)	0.0108 (11)	−0.0005 (11)
O6	0.0105 (11)	0.0174 (12)	0.0169 (12)	0.0049 (9)	0.0053 (9)	0.0087 (9)
O7	0.0152 (12)	0.0110 (11)	0.0200 (13)	−0.0007 (9)	0.0037 (10)	−0.0020 (9)
O8	0.0148 (11)	0.0155 (11)	0.0088 (11)	0.0007 (9)	0.0022 (9)	−0.0017 (9)
O9	0.0122 (11)	0.0169 (11)	0.0116 (11)	0.0062 (9)	0.0013 (9)	−0.0036 (9)
O10	0.0501 (18)	0.0256 (14)	0.0118 (13)	−0.0099 (13)	0.0023 (12)	0.0019 (11)
O11	0.0191 (12)	0.0147 (12)	0.0238 (13)	−0.0032 (10)	0.0055 (10)	0.0005 (10)
O12	0.0277 (14)	0.0168 (12)	0.0306 (15)	0.0003 (10)	0.0134 (11)	0.0057 (11)
O13	0.0214 (12)	0.0200 (12)	0.0084 (11)	−0.0019 (10)	0.0019 (9)	−0.0018 (9)
O14	0.0187 (12)	0.0216 (12)	0.0081 (11)	0.0069 (10)	0.0004 (9)	−0.0033 (9)
O15	0.0112 (11)	0.0169 (11)	0.0124 (11)	0.0056 (9)	0.0010 (9)	−0.0028 (9)
O16	0.0149 (11)	0.0139 (11)	0.0158 (12)	0.0035 (9)	0.0025 (9)	−0.0024 (9)
O17	0.0549 (19)	0.0406 (17)	0.0147 (14)	−0.0100 (14)	−0.0003 (13)	−0.0011 (12)
O18	0.0079 (11)	0.0179 (12)	0.0165 (12)	−0.0024 (9)	−0.0006 (9)	0.0013 (9)
O19	0.0089 (10)	0.0139 (11)	0.0142 (12)	0.0002 (9)	0.0004 (9)	0.0062 (9)
O20	0.0144 (12)	0.0158 (12)	0.0218 (13)	−0.0035 (9)	0.0033 (10)	0.0010 (10)
O21	0.0159 (12)	0.0161 (13)	0.0508 (18)	0.0078 (10)	0.0074 (12)	−0.0076 (12)
O22	0.0204 (12)	0.0226 (12)	0.0065 (11)	0.0072 (10)	−0.0009 (9)	−0.0024 (9)
O23	0.0140 (12)	0.0173 (12)	0.0442 (17)	0.0046 (10)	0.0035 (11)	0.0016 (11)
O24	0.0247 (13)	0.0100 (12)	0.0414 (16)	−0.0034 (10)	0.0150 (12)	−0.0010 (11)
O25	0.0173 (12)	0.0098 (11)	0.0140 (12)	0.0023 (9)	0.0048 (9)	−0.0043 (9)
O26	0.0101 (11)	0.0167 (11)	0.0158 (12)	0.0009 (9)	0.0003 (9)	0.0068 (9)
O27	0.0200 (12)	0.0131 (11)	0.0187 (13)	−0.0045 (9)	0.0061 (10)	0.0003 (9)
O28	0.0093 (11)	0.0157 (12)	0.0165 (12)	−0.0054 (9)	0.0014 (9)	0.0001 (9)
$K_5Eu(P_2O_7)_2$	U^{11}	U^{22}	U^{33}	U^{12}	U^{13}	U^{23}
K1	0.0681 (16)	0.0206 (10)	0.0262 (11)	0.0064 (10)	0.0195 (10)	0.0029 (8)
K2	0.0152 (8)	0.0282 (10)	0.0183 (9)	−0.0096 (7)	0.0003 (7)	−0.0032 (7)
K3	0.0264 (10)	0.0174 (9)	0.0247 (10)	−0.0002 (7)	0.0080 (8)	0.0054 (7)
K4	0.0249 (9)	0.0188 (9)	0.0194 (9)	0.0000 (7)	0.0040 (7)	−0.0015 (7)
K5	0.0332 (10)	0.0201 (9)	0.0174 (9)	0.0005 (8)	0.0049 (7)	0.0026 (7)
Eu1	0.0107 (2)	0.00869 (19)	0.0115 (2)	−0.00243 (14)	−0.00052 (13)	0.00029 (13)
P1	0.0095 (9)	0.0086 (9)	0.0122 (9)	−0.0024 (7)	−0.0002 (7)	−0.0010 (7)
P2	0.0108 (9)	0.0093 (9)	0.0147 (10)	−0.0034 (7)	−0.0023 (7)	0.0006 (7)
P3	0.0114 (9)	0.0130 (9)	0.0104 (9)	−0.0023 (7)	−0.0007 (7)	−0.0001 (7)
P4	0.0110 (9)	0.0140 (9)	0.0125 (9)	−0.0014 (7)	0.0002 (7)	−0.0009 (7)
O1	0.015 (3)	0.012 (3)	0.020 (3)	−0.003 (2)	−0.008 (2)	0.003 (2)
O2	0.020 (3)	0.028 (3)	0.014 (3)	−0.005 (2)	0.003 (2)	−0.002 (2)
O3	0.026 (3)	0.010 (3)	0.023 (3)	−0.007 (2)	−0.010 (2)	−0.001 (2)
O4	0.016 (3)	0.014 (3)	0.016 (3)	−0.006 (2)	0.002 (2)	−0.008 (2)

O5	0.011 (2)	0.009 (2)	0.018 (3)	−0.002 (2)	−0.003 (2)	0.003 (2)
O6	0.015 (3)	0.020 (3)	0.018 (3)	−0.005 (2)	0.008 (2)	0.004 (2)
O7	0.014 (3)	0.012 (3)	0.017 (3)	−0.001 (2)	−0.003 (2)	0.004 (2)
O8	0.025 (3)	0.020 (3)	0.028 (3)	−0.009 (2)	0.002 (2)	−0.003 (2)
O9	0.017 (3)	0.018 (3)	0.015 (3)	−0.005 (2)	−0.005 (2)	0.003 (2)
O10	0.023 (3)	0.039 (4)	0.014 (3)	−0.003 (3)	−0.001 (2)	−0.002 (3)
O11	0.014 (3)	0.024 (3)	0.017 (3)	0.000 (2)	0.001 (2)	−0.010 (2)
O12	0.030 (3)	0.014 (3)	0.022 (3)	−0.003 (2)	−0.001 (2)	−0.002 (2)
O13	0.019 (3)	0.027 (3)	0.020 (3)	−0.007 (2)	0.006 (2)	0.002 (2)
O14	0.018 (3)	0.020 (3)	0.015 (3)	−0.003 (2)	−0.002 (2)	−0.001 (2)
$K_5Tb(P_2O_7)_2$	U^{11}	U^{22}	U^{33}	U^{12}	U^{13}	U^{23}
K1	0.0236 (8)	0.0171 (8)	0.0241 (8)	0.0014 (6)	0.0078 (7)	0.0055 (6)
K2	0.0695 (14)	0.0206 (9)	0.0223 (9)	0.0077 (9)	0.0188 (9)	0.0029 (7)
K3	0.0162 (7)	0.0264 (8)	0.0175 (7)	−0.0101 (6)	0.0007 (6)	−0.0036 (6)
K4	0.0322 (9)	0.0178 (8)	0.0154 (8)	0.0005 (7)	0.0054 (6)	0.0028 (6)
K5	0.0257 (8)	0.0179 (7)	0.0169 (8)	−0.0008 (6)	0.0010 (6)	−0.0012 (6)
Tb1	0.01059 (16)	0.00787 (16)	0.00940 (16)	−0.00283 (11)	0.00055 (11)	0.00030 (11)
P1	0.0083 (7)	0.0073 (7)	0.0104 (8)	−0.0028 (6)	0.0017 (6)	−0.0002 (6)
P2	0.0104 (8)	0.0077 (7)	0.0128 (8)	−0.0024 (6)	−0.0020 (6)	0.0010 (6)
P3	0.0116 (8)	0.0162 (9)	0.0113 (8)	−0.0038 (7)	0.0011 (6)	−0.0017 (7)
P4	0.0123 (8)	0.0124 (8)	0.0082 (8)	−0.0022 (6)	0.0005 (6)	−0.0006 (6)
O1	0.013 (2)	0.013 (2)	0.014 (2)	−0.0003 (18)	−0.0048 (18)	0.0033 (18)
O2	0.016 (2)	0.018 (2)	0.019 (2)	−0.0081 (19)	0.0040 (19)	0.0023 (19)
O3	0.016 (2)	0.012 (2)	0.013 (2)	−0.0027 (18)	−0.0008 (18)	0.0004 (18)
O4	0.015 (2)	0.017 (2)	0.017 (2)	−0.0081 (19)	0.0012 (18)	−0.0054 (19)
O5	0.019 (2)	0.018 (2)	0.019 (3)	−0.007 (2)	0.007 (2)	0.000 (2)
O6	0.020 (2)	0.008 (2)	0.023 (3)	−0.0048 (19)	−0.009 (2)	0.0021 (19)
O7	0.015 (2)	0.013 (2)	0.016 (2)	−0.0046 (18)	−0.0065 (18)	0.0022 (18)
O8	0.025 (3)	0.021 (3)	0.037 (3)	−0.011 (2)	0.004 (2)	−0.010 (2)
O9	0.020 (3)	0.044 (3)	0.013 (3)	−0.001 (2)	0.003 (2)	−0.002 (2)
O10	0.014 (2)	0.019 (2)	0.017 (2)	−0.0018 (19)	−0.0015 (18)	0.0026 (19)
O11	0.010 (2)	0.027 (3)	0.019 (2)	−0.0026 (19)	−0.0048 (18)	−0.009 (2)
O12	0.020 (2)	0.018 (2)	0.009 (2)	−0.0074 (19)	−0.0013 (18)	0.0026 (18)
O13	0.032 (3)	0.012 (2)	0.021 (3)	0.000 (2)	−0.001 (2)	0.000 (2)
O14	0.020 (3)	0.026 (3)	0.014 (2)	−0.005 (2)	0.0081 (19)	0.001 (2)

Table S3. Selected Interatomic Distances (Å) and Angles (°) of $K_5REE(P_2O_7)_2$ (REE=Y, Eu, Tb).

$K_5Y(P_2O_7)_2$			
K1—O12	2.694 (2)	K8—O24	2.773 (2)
K1—O27	2.745 (2)	K8—O3	2.808 (2)

K1—O4	2.846 (2)	K8—O2^{ix}	2.836 (2)
K1—O2	2.914 (2)	K8—O20^{ix}	2.887 (2)
K1—O25	2.974 (2)	K8—O8	3.043 (2)
K1—O10^{i}	3.057 (3)	K9—O10	2.647 (2)
K1—O21	3.201 (3)	K9—O24	2.663 (2)
K1—O5	3.318 (3)	K9—O25	2.735 (2)
K1—O22	3.412 (2)	K9—O27^{ii}	2.740 (2)
K2—O16	2.693 (2)	K9—O2^{ii}	2.741 (2)
K2—O1	2.751 (2)	K9—O3	2.951 (2)
K2—O7^{ii}	2.879 (2)	K10—O17	2.644 (3)
K2—O10	2.881 (2)	K10—O4	2.656 (2)
K2—O12	2.890 (2)	K10—O1	2.691 (2)
K2—O24	2.993 (3)	K10—O7	2.702 (2)
K2—O11^{ii}	3.044 (2)	K10—O11	2.761 (2)
K3—O27	2.708 (2)	K10—O12	2.869 (2)
K3—O6	2.739 (2)	Y1—O20	2.211 (2)
K3—O3^{i}	2.818 (2)	Y1—O28^{x}	2.252 (2)
K3—O8^{iii}	2.851 (2)	Y1—O14^{x}	2.291 (2)
K3—O15	2.908 (2)	Y1—O15^{v}	2.292 (2)
K3—O15^{iii}	2.959 (2)	Y1—O8^{ix}	2.351 (2)
K3—O19^{iii}	3.036 (2)	Y1—O16^{i}	2.374 (2)
K3—O8	3.073 (2)	Y1—O3^{ix}	2.595 (2)
K3—O28^{i}	3.241 (2)	Y2—O5	2.198 (2)
K4—O11	2.810 (2)	Y2—O21	2.216 (2)
K4—O23^{iv}	2.826 (2)	Y2—O22	2.242 (2)
K4—O9^{v}	2.901 (2)	Y2—O18^{viii}	2.254 (2)
K4—O17	2.950 (3)	Y2—O9	2.263 (2)
K4—O9^{vi}	2.952 (2)	Y2—O13	2.280 (2)
K4—O18	3.002 (2)	P1—O17^{iv}	1.486 (3)
K4—O13^{v}	3.033 (2)	P1—O12	1.489 (2)
K4—O21^{iv}	3.190 (3)	P1—O21	1.534 (2)
K4—O13^{vi}	3.290 (2)	P1—O23	1.627 (2)
K4—O26^{vii}	3.295 (2)	P2—O24	1.490 (2)
K5—O7	2.730 (2)	P2—O3^{xi}	1.528 (2)
K5—O1^{i}	2.734 (2)	P2—O16	1.531 (2)
K5—O5^{vi}	2.831 (2)	P2—O6^{ix}	1.619 (2)
K5—O7^{vi}	2.858 (2)	P3—O11	1.487 (2)
K5—O17^{i}	2.891 (3)	P3—O14^{x}	1.515 (2)
K5—O17^{vi}	2.965 (3)	P3—O9^{v}	1.536 (2)
K5—O12^{i}	3.026 (2)	P3—O26^{i}	1.624 (2)
K5—O13^{vi}	3.190 (2)	P4—O10	1.488 (2)
K6—O25	2.737 (2)	P4—O7^{ii}	1.498 (2)
K6—O14	2.762 (2)	P4—O5^{ii}	1.530 (2)

K6—O23	2.771 (3)	P4—O23	1.620 (2)
K6—O10	2.888 (3)	P5—O27	1.492 (2)
K6—O21	3.013 (3)	P5—O22	1.519 (2)
K6—O28	3.029 (2)	P5—O15	1.522 (2)
K6—O9^{ii}	3.052 (2)	P5—O19	1.622 (2)
K6—O26^{viii}	3.165 (2)	P6—O4	1.493 (2)
K6—O19	3.327 (2)	P6—O2	1.500 (2)
K7—O4	2.678 (2)	P6—O20	1.532 (2)
K7—O16	2.743 (2)	P6—O6^{ix}	1.664 (2)
K7—O22^{v}	2.837 (2)	P7—O25	1.498 (2)
K7—O1	2.875 (2)	P7—O8	1.523 (2)
K7—O18	2.975 (2)	P7—O28	1.526 (2)
K7—O15^{v}	3.029 (2)	P7—O19	1.629 (2)
K7—O19^{v}	3.086 (2)	P8—O1	1.493 (2)
K7—O6^{ix}	3.226 (2)	P8—O13^{iv}	1.520 (2)
K7—O26	3.237 (2)	P8—O18	1.525 (2)
K8—O2	2.683 (2)	P8—O26	1.617 (2)
K8—O25	2.739 (2)		
O17^{iv}—P1—O12	114.96 (15)	O27—P5—O22	114.54 (13)
O17^{iv}—P1—O21	111.98 (15)	O27—P5—O15	113.61 (13)
O12—P1—O21	114.98 (14)	O22—P5—O15	113.01 (12)
O17^{iv}—P1—O23	105.22 (15)	O27—P5—O19	110.43 (12)
O12—P1—O23	109.32 (13)	O22—P5—O19	102.74 (12)
O21—P1—O23	98.56 (13)	O15—P5—O19	101.02 (12)
O24—P2—O3^{xi}	116.44 (14)	O4—P6—O2	115.31 (13)
O24—P2—O16	115.51 (13)	O4—P6—O20	114.05 (13)
O3^{xi}—P2—O16	104.50 (13)	O2—P6—O20	112.14 (13)
O24—P2—O6^{ix}	107.90 (12)	O4—P6—O6^{ix}	106.63 (12)
O3^{xi}—P2—O6^{ix}	104.34 (12)	O2—P6—O6^{ix}	107.09 (12)
O16—P2—O6^{ix}	107.28 (12)	O20—P6—O6^{ix}	100.03 (12)
O11—P3—O14^{x}	115.84 (13)	O25—P7—O8	115.40 (12)
O11—P3—O9^{v}	113.24 (13)	O25—P7—O28	113.81 (12)
O14^{x}—P3—O9^{v}	111.57 (12)	O8—P7—O28	113.09 (12)
O11—P3—O26^{i}	110.51 (12)	O25—P7—O19	106.69 (12)
O14^{x}—P3—O26^{i}	103.26 (12)	O8—P7—O19	106.04 (12)
O9^{v}—P3—O26^{i}	100.86 (12)	O28—P7—O19	100.03 (11)
O10—P4—O7^{ii}	115.56 (13)	O1—P8—O13^{iv}	114.91 (13)
O10—P4—O5^{ii}	111.36 (14)	O1—P8—O18	112.52 (12)
O7^{ii}—P4—O5^{ii}	112.28 (13)	O13^{iv}—P8—O18	112.47 (12)
O10—P4—O23	108.57 (15)	O1—P8—O26	107.44 (12)
O7^{ii}—P4—O23	108.28 (13)	O13^{iv}—P8—O26	107.11 (12)
O5^{ii}—P4—O23	99.45 (13)	O18—P8—O26	101.16 (12)
Symmetry codes: (i) *x*−1, *y*, *z*; (ii) *x*+1, *y*, *z*; (iii) −*x*, −*y*+2, −*z*+1; (iv) −*x*, −*y*+1, −*z*; (v) *x*, *y*−1, *z*; (vi) −*x*−1,			

−*y*+1, −*z*; (vii) −*x*, −*y*, −*z*; (viii) *x*, *y*+1, *z*; (ix) −*x*, −*y*+1, −*z*+1; (x) *x*−1, *y*−1, *z*; (xi) −*x*+1, −*y*+1, −*z*+1.			
$K_5Eu(P_2O_7)_2$			
K1—O9	2.666 (5)	K5—O3^{vii}	2.768 (5)
K1—O7	2.755 (5)	K5—O7	2.835 (5)
K1—O12^{i}	2.784 (6)	K5—O6	3.039 (5)
K1—O2	2.881 (6)	K5—O1^{vii}	3.056 (5)
K1—O14^{i}	2.886 (5)	K5—O4^{vii}	3.163 (5)
K1—O10	3.003 (6)	K5—O4	3.232 (5)
K1—O10^{i}	3.371 (6)	K5—O11	3.241 (6)
K2—O7^{i}	2.653 (5)	Eu1—O13^{ii}	2.273 (5)
K2—O14^{ii}	2.689 (5)	Eu1—O6^{vii}	2.306 (5)
K2—O10	2.712 (6)	Eu1—O3	2.315 (5)
K2—O12^{i}	2.727 (5)	Eu1—O1^{ix}	2.350 (5)
K2—O2^{iii}	2.744 (5)	Eu1—O5^{viii}	2.398 (5)
K2—O8^{iv}	3.085 (6)	Eu1—O9	2.414 (5)
K3—O14	2.716 (5)	Eu1—O8	2.628 (5)
K3—O7^{i}	2.742 (5)	P1—O7	1.491 (5)
K3—O10	2.787 (5)	P1—O5	1.522 (5)
K3—O8^{iv}	2.810 (6)	P1—O6	1.526 (5)
K3—O14^{v}	2.856 (5)	P1—O4	1.618 (5)
K3—O13^{v}	2.857 (6)	P2—O2	1.480 (5)
K3—O5^{i}	3.068 (5)	P2—O3	1.517 (5)
K4—O2^{vi}	2.788 (5)	P2—O1	1.531 (5)
K4—O11	2.789 (5)	P2—O4	1.639 (5)
K4—O8	2.845 (6)	P3—O14	1.493 (5)
K4—O1^{vi}	2.857 (5)	P3—O12	1.499 (5)
K4—O5^{vii}	2.887 (5)	P3—O13	1.520 (5)
K4—O1^{vii}	2.950 (5)	P3—O11	1.660 (5)
K4—O5^{vi}	2.995 (5)	P4—O10	1.482 (5)
K4—O6^{viii}	3.173 (5)	P4—O8	1.522 (5)
K4—O4^{vii}	3.236 (5)	P4—O9	1.537 (5)
K5—O12	2.706 (5)	P4—O11	1.618 (5)
K5—O9	2.756 (5)		
O7—P1—O5	114.7 (3)	O14—P3—O12	115.3 (3)
O7—P1—O6	113.3 (3)	O14—P3—O13	112.3 (3)
O5—P1—O6	113.0 (3)	O12—P3—O13	113.6 (3)
O7—P1—O4	106.5 (3)	O14—P3—O11	106.6 (3)
O5—P1—O4	107.6 (3)	O12—P3—O11	108.0 (3)
O6—P1—O4	100.3 (3)	O13—P3—O11	99.5 (3)
O2—P2—O3	115.5 (3)	O10—P4—O8	116.3 (3)
O2—P2—O1	113.9 (3)	O10—P4—O9	115.3 (3)
O3—P2—O1	112.1 (3)	O8—P4—O9	105.4 (3)
O2—P2—O4	109.9 (3)	O10—P4—O11	108.3 (3)

O3—P2—O4	102.8 (3)	O8—P4—O11	103.9 (3)
O1—P2—O4	101.0 (3)	O9—P4—O11	106.6 (3)
Symmetry codes: (i) −*x*+1, −*y*+1, −*z*+1; (ii) *x*−1, *y*, *z*; (iii) −*x*, −*y*+1, −*z*+1; (iv) −*x*+1, −*y*, −*z*+1; (v) −*x*+2, −*y*, −*z*+1; (vi) *x*+1, *y*−1, *z*; (vii) −*x*+1, −*y*+1, −*z*; (viii) *x*, *y*−1, *z*; (ix) −*x*, −*y*+1, −*z*.			
$K_5Tb(P_2O_7)_2$			
K1—O12^{i}	2.712 (4)	K5—O8	2.839 (5)
K1—O1	2.738 (4)	K5—O7^{iii}	2.847 (4)
K1—O9^{i}	2.795 (5)	K5—O3	2.868 (4)
K1—O8^{ii}	2.803 (5)	K5—O7	2.961 (4)
K1—O12^{iii}	2.852 (4)	K5—O3^{iii}	3.024 (4)
K1—O14^{iii}	2.857 (5)	K5—O2^{ii}	3.182 (4)
K1—O3	3.061 (4)	K5—O4	3.187 (4)
K2—O10^{iv}	2.669 (5)	Tb1—O14	2.237 (4)
K2—O1	2.777 (4)	Tb1—O2^{v}	2.276 (4)
K2—O13^{i}	2.787 (5)	Tb1—O6^{vii}	2.298 (4)
K2—O5	2.859 (5)	Tb1—O7	2.316 (4)
K2—O12^{i}	2.886 (4)	Tb1—O3^{iii}	2.371 (4)
K2—O9^{iv}	2.966 (5)	Tb1—O10^{v}	2.388 (4)
K2—O9^{i}	3.343 (5)	Tb1—O8^{v}	2.650 (5)
K3—O1^{v}	2.645 (4)	P1—O1	1.499 (4)
K3—O12^{i}	2.686 (4)	P1—O2	1.522 (4)
K3—O9^{vi}	2.711 (5)	P1—O3	1.525 (4)
K3—O13^{vii}	2.717 (4)	P1—O4	1.618 (4)
K3—O5	2.722 (4)	P2—O5	1.496 (4)
K3—O8^{iii}	3.047 (5)	P2—O6	1.515 (4)
K4—O13	2.710 (5)	P2—O7	1.533 (4)
K4—O10	2.764 (4)	P2—O4	1.632 (4)
K4—O6	2.786 (5)	P3—O9	1.489 (5)
K4—O1^{iv}	2.819 (4)	P3—O8	1.525 (5)
K4—O2^{iv}	3.030 (4)	P3—O10	1.528 (4)
K4—O7	3.059 (4)	P3—O11	1.620 (4)
K4—O4	3.117 (4)	P4—O13	1.495 (4)
K4—O11	3.200 (5)	P4—O12	1.496 (4)
K4—O4^{iv}	3.258 (4)	P4—O14	1.527 (4)
K5—O11	2.763 (4)	P4—O11	1.652 (4)
K5—O5^{iii}	2.774 (4)		
O1—P1—O2	113.4 (2)	O9—P3—O8	117.0 (3)
O1—P1—O3	114.6 (2)	O9—P3—O10	114.9 (3)
O2—P1—O3	113.0 (2)	O8—P3—O10	105.2 (3)
O1—P1—O4	106.8 (2)	O9—P3—O11	108.6 (3)
O2—P1—O4	100.5 (2)	O8—P3—O11	104.0 (3)
O3—P1—O4	107.1 (2)	O10—P3—O11	106.2 (2)
O5—P2—O6	115.1 (2)	O13—P4—O12	115.1 (3)

O5—P2—O7	113.8 (3)	O13—P4—O14	113.8 (3)
O6—P2—O7	112.4 (2)	O12—P4—O14	112.4 (3)
O5—P2—O4	110.3 (2)	O13—P4—O11	107.6 (3)
O6—P2—O4	102.9 (2)	O12—P4—O11	106.9 (2)
O7—P2—O4	100.7 (2)	O14—P4—O11	99.5 (2)
Symmetry codes: (i) *x*, *y*, *z*−1; (ii) −*x*, −*y*, −*z*+1; (iii) −*x*+1, −*y*, −*z*+1; (iv) −*x*, −*y*+1, −*z*+1; (v) *x*+1, *y*, *z*; (vi) *x*+1, *y*, *z*−1; (vii) −*x*+1, −*y*+1, −*z*+1.			

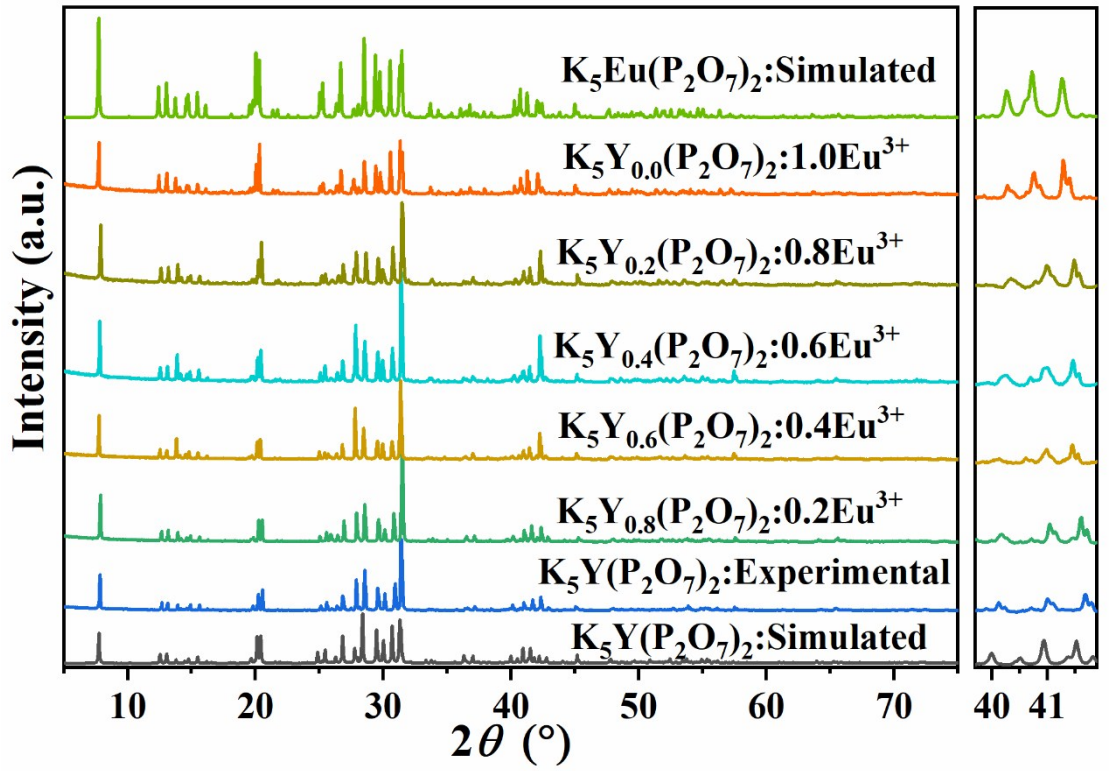

Figure S1. XRD patterns of powder samples $KY_{1-x}E_xP$ ($0 \le x \le 1.0$) comparing with that simulated from single data of KYP and KEP.

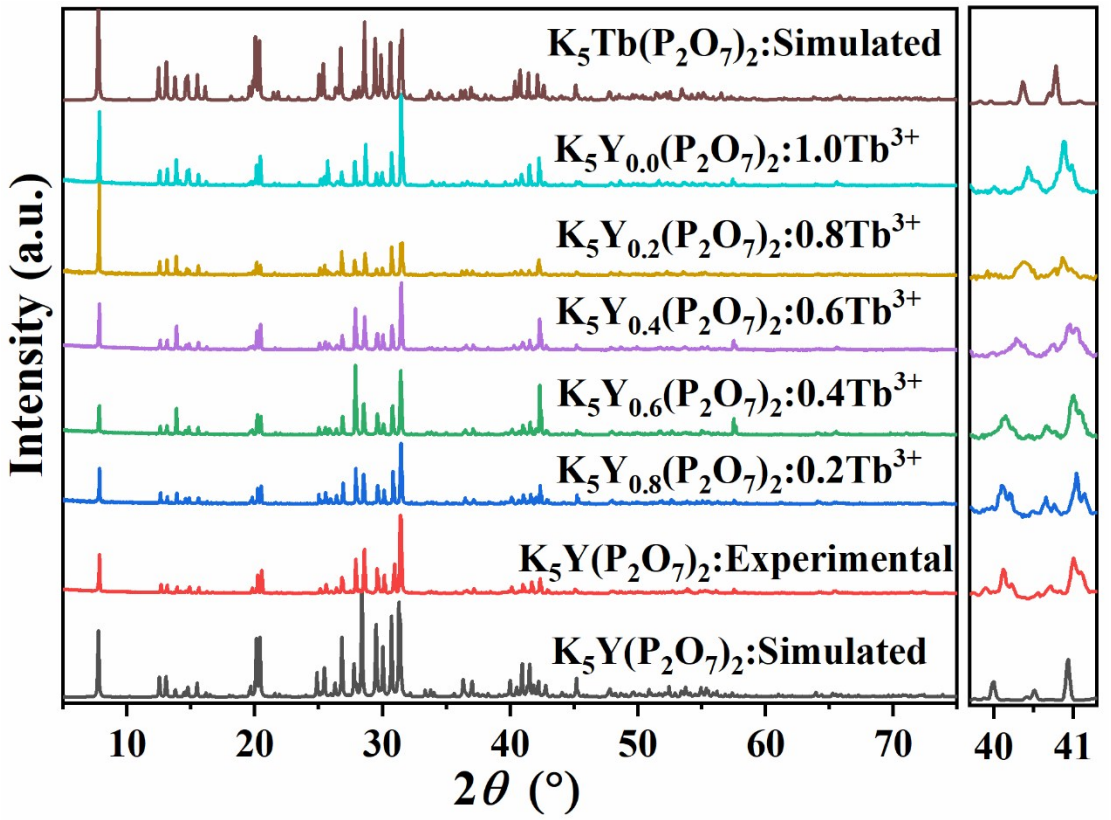

Figure S2. XRD patterns of powder samples $KY_{1-x}T_xP$ ($0 \leq x \leq 1.0$) comparing with that simulated from single data of KYP and KTP.

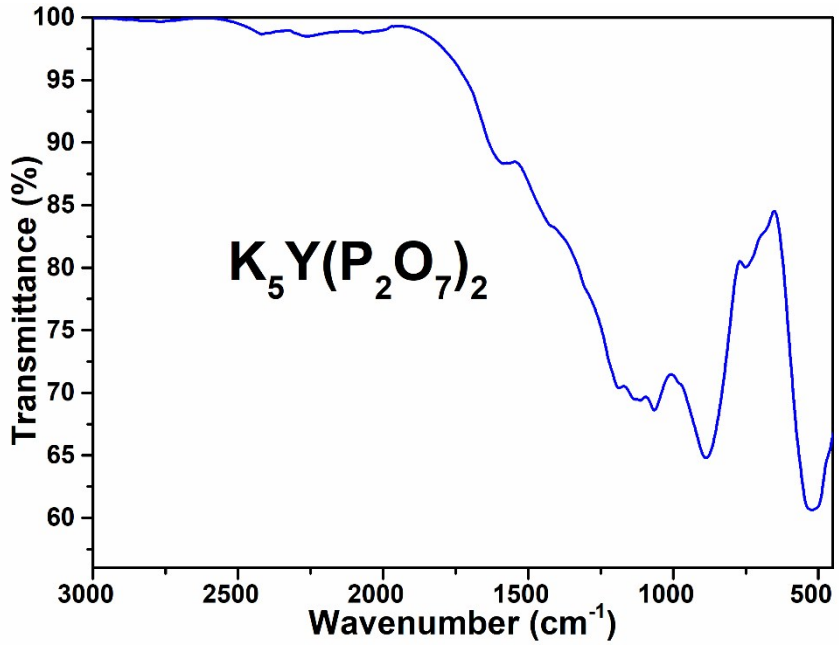

Figure S3. IR spectrum of KYP in the range of 3000−450 cm^{-1}.

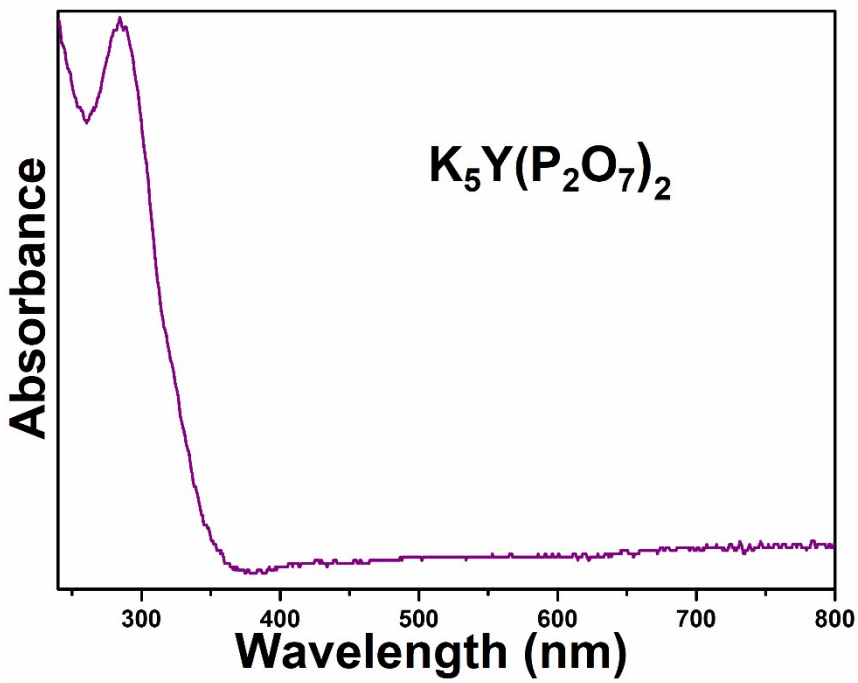

Figure S4. UV-Vis absorption spectrum of KYP in the range of 240−800 nm.

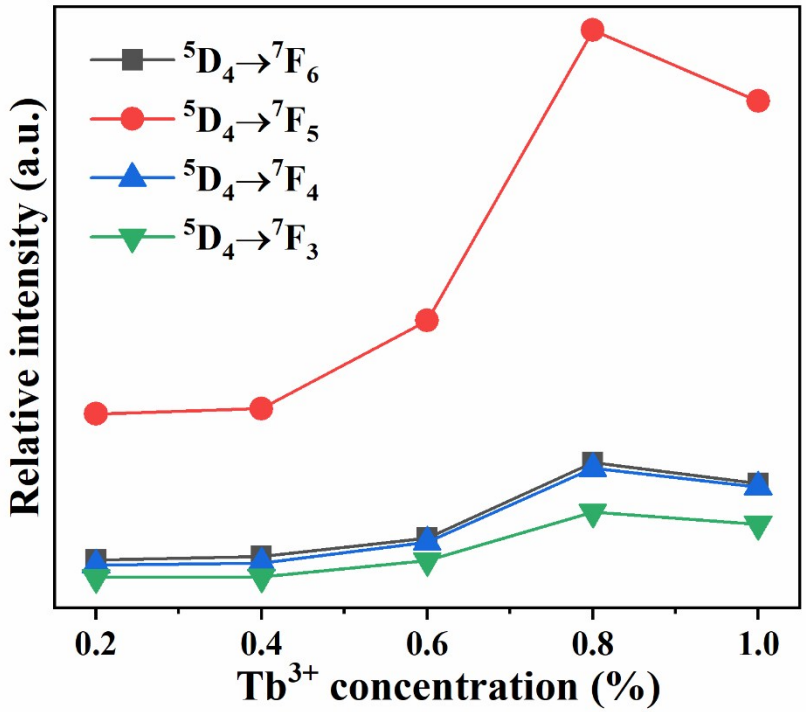

Figure S5. The relative intensity of different emitting levels variating with the activator concentration of $KY_{1-y}T_yP$ ($0.2 \leq y \leq 1.0$).

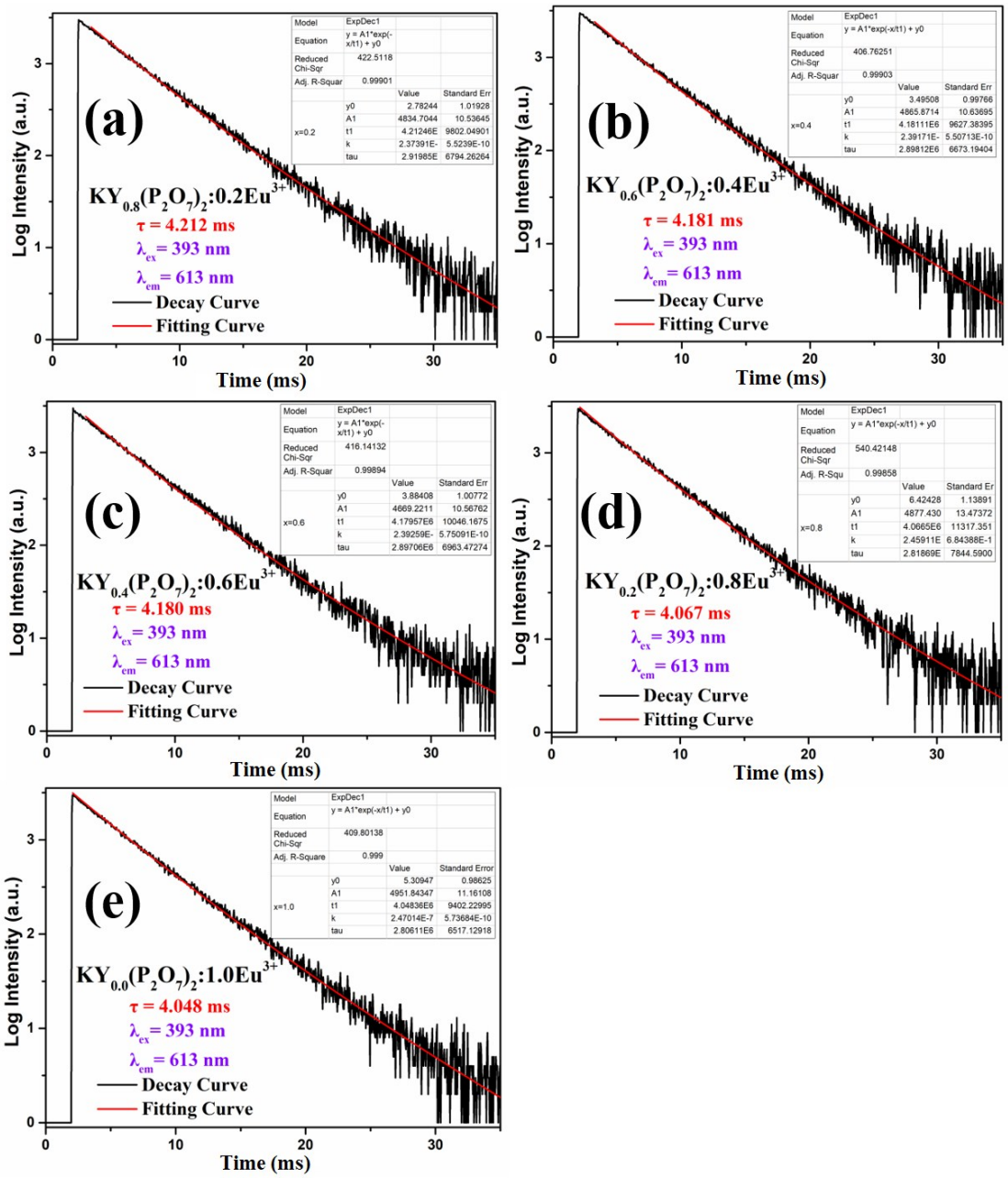

Figure S6. Fluorescent decay and fitting curves of $KY_{0.8}E_{0.2}P$ (a), $KY_{0.6}E_{0.4}P$ (b), $KY_{0.4}E_{0.6}P$ (c), $KY_{0.2}E_{0.8}P$ (d) and $KY_{0}E_{1.0}P$ (e).

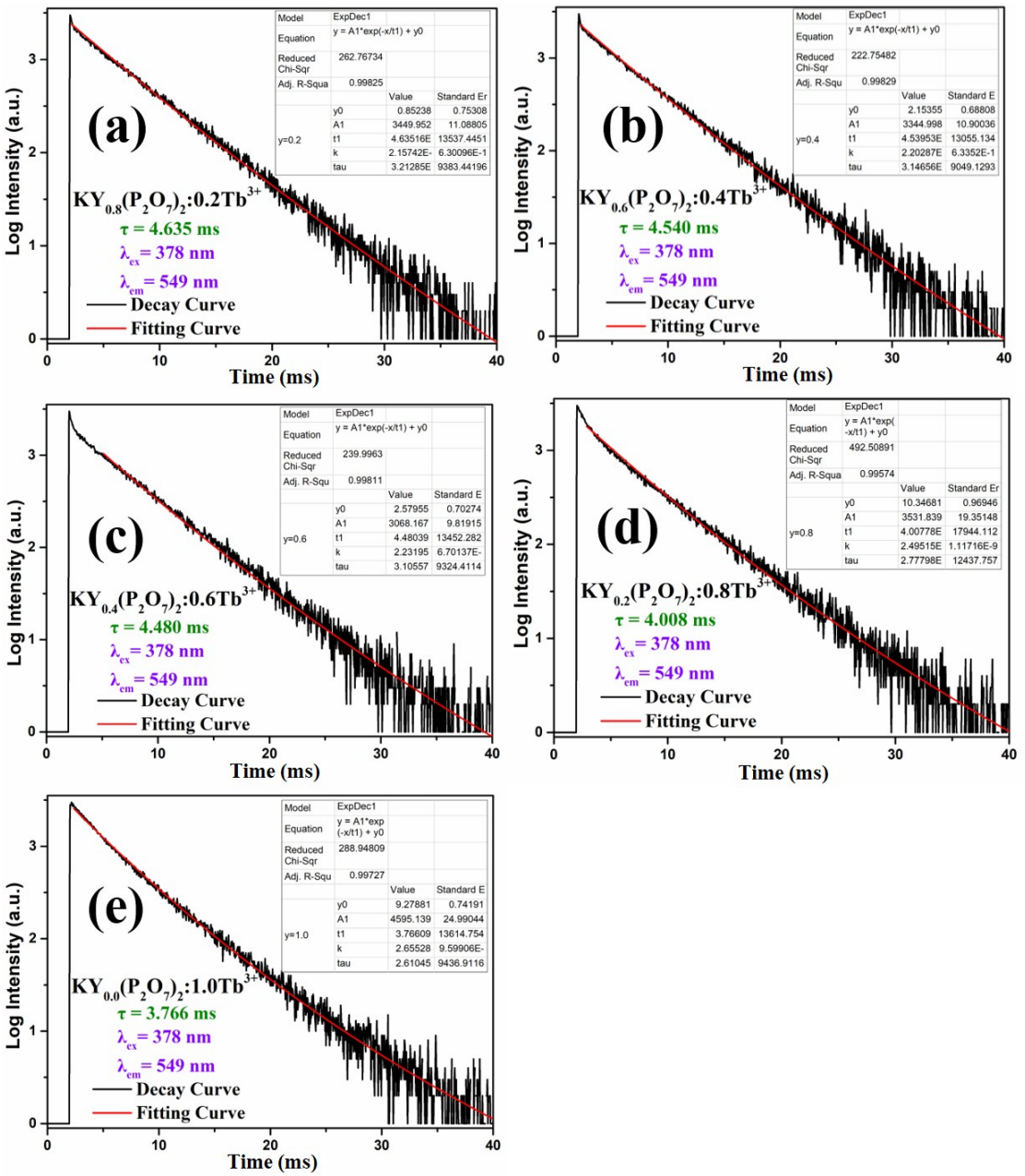

Figure S7. Fluorescent decay and fitting curves of $KY_{0.8}T_{0.2}P$ (a), $KY_{0.6}T_{0.4}P$ (b), $KY_{0.4}T_{0.6}P$ (c), $KY_{0.2}T_{0.8}P$ (d) and $KY_0T_{1.0}P$ (e).

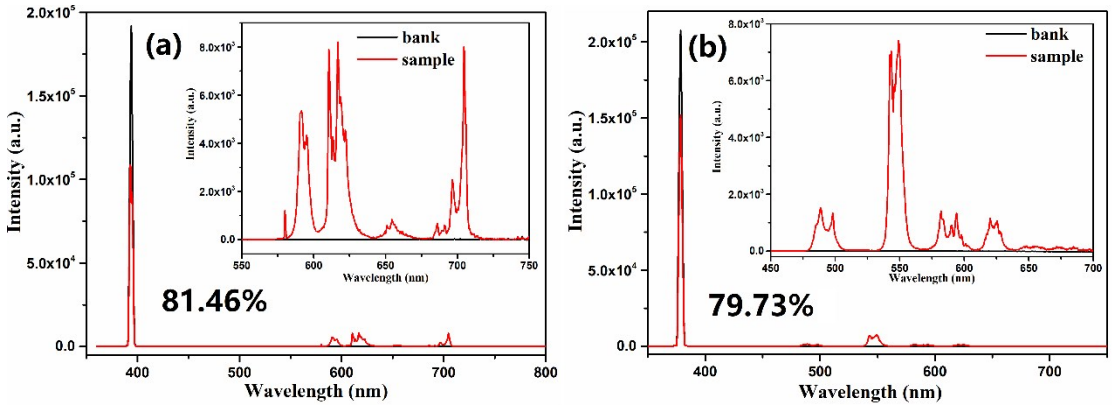

Figure S8. Excitation line of $BaSO_4$ and emission spectra of $KY_0E_{1.0}P$ (a) and $KY_{0.2}T_{0.8}P$ (b) phosphors collected by using an integrating sphere. The insets show the magnification of the emission spectra.