Table 6. Recommended standard thermodynamic properties of monazite, xenotime, and rhabdophane at temperature of 298.15 K and pressure of 1 bar, and heat capacity function, with T in Kelvin.

	ΔG°_f	ΔH°_f	ΔS°_f[16]	S°[16]	V°_m[34]	$Cp = a + bT + c/T^2 + d/T^{0.5}$				
	kJ mol^{-1}	kJ mol^{-1}	J mol^{-1}K^{-1}	J mol^{-1}K^{-1}	J mol^{-1} bar^{-1}	*a*	*b*100*	*c*	*d*	Reference
Monazite										
$LaPO_4$	-1861.2	-1980.46	-400.0	108.3	46.03	121.13	3.0116	-2562500	-	[15]
$CePO_4$	*-1851.7*	-1971.33	-401.3	120.0	45.16	125.21	2.7894	-2408500	-	[15]
$PrPO_4$	-1855.6	-1975.55	-402.3	123.2	44.45	124.50	3.0374	-2449500	-	[15]
$NdPO_4$	-1846.2	-1965.76	-401.0	122.9	43.86	132.96	2.2541	-3100900	-	[15]
$SmPO_4$	*-1840.7*	-1959.52	-398.7	122.5	42.81	133.13	2.3468	-3068700	-	[15]
$EuPO_4$	*-1748.3*	-1871.17	-412.1	117.2	42.40	137.56	1.7693	-2785400	-	[15]
$GdPO_4$	*-1835.7*	-1953.47	-395.0	124.6	42.01	133.24	1.2793	-3097200	-	[15]
$TbPO_4$	*-1841.7*	-	-	-	[1]41.53	-	-	-	-	This study
$DyPO_4$	*-1838.3*	-	-	-	[2]*41.10*	-	-	-	-	This study
(YPO$_4$)	*-1859.7*	-	-	-	[2]*40.82*	-	-	-	-	This study
(HoPO$_4$)	*-1849.6*	-	-	-	[2]*40.71*	-	-	-	-	This study
(ErPO$_4$)	*-1843.1*	-	-	-	[2]*40.37*	-	-	-	-	This study
(TmPO$_4$)	*-1843.0*	-	-	-	[2]*40.03*	-	-	-	-	This study
(YbPO$_4$)	*-1813.8*	-	-	-	[2]*39.68*	-	-	-	-	This study
(LuPO$_4$)	*-1859.7*	-	-	-	[2]*39.34*	-	-	-	-	This study
Xenotime										
(LaPO$_4$)	*-1857.1*	-	-	-	[2]*49.35*	-	-	-	-	This study
(CePO$_4$)	*-1846.4*	-	-	-	[2]*48.56*	-	-	-	-	This study
(PrPO$_4$)	*-1849.8*	-	-	-	[2]*47.77*	-	-	-	-	This study
(NdPO$_4$	*-1840.6*	-	-	-	[2]*47.00*	-	-	-	-	This study
(SmPO$_4$)	*-1832.7*	-	-	-	[2]*45.66*	-	-	-	-	This study
(EuPO$_4$)	*-1741.6*	-	-	-	[2]*45.08*	-	-	-	-	This study
(GdPO$_4$)	*-1829.1*	-	-	-	[2]*44.51*	-	-	-	-	This study
$TbPO_4$	-1831.1	-1946.3	-386.6	138.1	43.90	116.4	4.55	-2190000	-	[67]
$DyPO_4$	-1829.1	-1945.0	-388.6	138.1	43.35	185.5	0.00	-3261000	-751.900	[68]
YPO_4	-1849.1	-1964.4	-386.8	108.8	43.14	131.3	1.992	-3563700	-	[54]
$HoPO_4$	-1836.8	-1951.4	-384.4	142.3	42.90	124.4	2.658	-2690000	-	[59]
$ErPO_4$	-1831.3	-1952.8	-407.7	116.6	42.37	205.5	-0.076	-859073	-1651.88	[20]
$TmPO_4$	-1830.5	-1945.9	-387.1	138.1	42.00	128.8	1.904	-3090000	-	[12]
$YbPO_4$	-1801.0	-1913.5	-377.1	133.9	41.64	198.0	0.448	-991250	-1506.38	[55]
$LuPO_4$	-1826.7	-1941.6	-385.2	117.2	41.22	130.7	1.85	-3330000	-	[53], [69]
Rhabdophane										
$LaPO_4{\cdot}0.667H_2O$	-2004.0	-2151.3	-494.0	170.0	-	-	-	-	-	[9]
$CePO_4{\cdot}0.667H_2O$	-1997.0	-2147.3	-504.0	175.0	-	-	-	-	-	[9]
$PrPO_4{\cdot}0.667H_2O$	-2003.0	-2144.0	-473.0	210.0	-	-	-	-	-	[9]
$NdPO_4{\cdot}0.667H_2O$	-1994.0	-2142.8	-499.0	180.0	-	-	-	-	-	[9]
$SmPO_4{\cdot}0.667H_2O$	-1989.0	-2137.8	-499.0	177.0	-	-	-	-	-	[9]
$EuPO_4{\cdot}0.667H_2O$	-1896.0	-2056.4	-538.0	149.0	-	-	-	-	-	[9]
$GdPO_4{\cdot}0.667H_2O$	-1984.0	-2130.7	-492.0	182.0	-	-	-	-	-	[9]
$TbPO_4{\cdot}0.667H_2O$	*-1989.9*	-	-	-	-	-	-	-	-	This study
$DyPO_4{\cdot}0.667H_2O$	*-1986.6*	-	-	-	-	-	-	-	-	This study

[1]V_m of monazite $TbPO_4$ is from Ushakov et al. [41]

[2]V_m of monazite $DyPO_4$ and other monazite fictive end-members are calculated from Eq. (16); V_m of xenotime fictive end-members are calculated from Eq. (17)

Note that in the ΔG°_f and V°_m columns, the data in regular font and red color are retrieved from experiments, and the data in italic font are calculated in this study; The REE phosphates in parentheses are fictive end-members; The references for the ΔG°_f values retrieved from experiments can be found in the text.