**Table S1**. Bulk modulus values reported in the literature for natural and synthetic *AT*O4 phosphates and arsenates, based on experimental and theoretical data.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | *A*-site  ionic radius  (Å) | Structure type | Bulk modulus (GPa) | Reference |
| ScPO4 | 0.87 | Zircon | 175.1 | Li et al. (2009)§ |
| ScPO4 | 0.87 | Zircon | 203 | Zhang et al. (2009) |
| ScPO4 | 0.87 | Zircon | 183 | Zhang et al. (2009)§ |
| ScPO4-II | 0.87 | Scheelite | 376 | Zhang et al. (2009) |
| ScPO4-II | 0.87 | Scheelite | 334 | Zhang et al. (2009)§ |
| ScAsO4 | 0.87 | Zircon | 166 | Li et al. (2009)§ |
| xenotime-(Y) | 1.021 | Zircon | 148 | Mogilewsky et al. (2006) |
| xenotime-(Y)-II | 1.076 | Monazite | 146 | This study |
| xenotime-(Y) | 1.020 | Zircon | 132 | This study |
| YPO4 | 1.019 | Zircon | 144.4 | Li et al. (2009)§ |
| YPO4 | 1.019 | Zircon | 165.5 | Zhang et al. (2009)§ |
| YPO4 | 1.019 | Zircon | 186 | Zhang et al. (2009) |
| YPO4 | 1.019 | Zircon | 149 | Lacomba-Perales et al. (2010) |
| YPO4-II | 1.075 | Monazite | 260 | Zhang et al. (2009) |
| YPO4-II | 1.075 | Monazite | 206 | Lacomba-Perales et al. (2010) |
| YPO4-III | 1.019 | Scheelite | 213 | Zhang et al. (2009)§ |
| chernovite-(Y) | 1.023 | Zircon | 136 | This study |
| chernovite-(Y) | 1.053 | Zircon | 125 | This study |
| YAsO4 | 1.019 | Zircon | 137 | Li et al. (2009)§ |
| YAsO4 | 1.019 | Zircon | 142 | Errandonea et al. (2011) |
| YAsO4 | 1.019 | Zircon | 115.5 | Errandonea et al. (2011)§ |
| YAsO4-II | 1.019 | Scheelite | 149 | Errandonea et al. (2011) |
| LaPO4 | 1.216 | Monazite | 134 | Li et al. (2009)§ |
| LaPO4 | 1.216 | Monazite | 114.2 | Errandonea et al. (2018) |
| LaPO4 | 1.216 | Monazite | 125 | Ruitz-Fuertes et al. (2016) |
| LaPO4 | 1.216 | Monazite | 144 | Lacomba-Perales et al. (2010) |
| LaPO4-II | 1.31 | Post-barite | 143 | Lacomba-Perales et al. (2010) |
| LaAsO4 | 1.216 | Monazite | 124.5 | Li et al. (2009)§ |
| monazite-(Ce) | 1.184 | Monazite | 122 | This study |
| CePO4 | 1.196 | Monazite | 137.2 | Li et al. (2009)§ |
| CePO4 | 1.196 | Monazite | 117.3 | Errandonea et al. (2018) |
| CePO4 | 1.196 | Monazite | 122 | Huang et al. (2010) (up to 11 Gpa) |
| CePO4 | 1.196 | Monazite | 109 | Huang et al. (2010) (up to 20 Gpa) |
| gasparite-(Ce) | 1.189 | Monazite | 109 | This study |
| CeAsO4 | 1.196 | Monazite | 125.1 | Li et al. (2009)§ |
| PrPO4 | 1.179 | Monazite | 139.7 | Li et al. (2009)§ |
| PrPO4 | 1.179 | Monazite | 120.2 | Errandonea et al. (2018) |
| NdPO4 | 1.163 | Monazite | 142.3 | Li et al. (2009)§ |
| NdPO4 | 1.163 | Monazite | 160 | Lacomba-Perales et al. (2010) |
| NdAsO4 | 1.163 | Monazite | 130.6 | Li et al. (2009)§ |
| SmPO4 | 1.132 | Scheelite | 146 | Li et al. (2009)§ |
| SmAsO4 | 1.079 | Zircon | 124.7 | Li et al. (2009)§ |
| EuPO4 | 1.12 | Monazite | 147. | Li et al. (2009)§ |
| EuPO4 | 1.12 | Monazite | 159 | Lacomba-Perales et al. (2010) |
| GdPO4 | 1.107 | Monazite | 149 | Li et al. (2009)§ |
| GdPO4 | 1.107 | Monazite | 160 | Lacomba-Perales et al. (2010) |
| GdPO4 | 1.107 | Monazite | 128.1 | Heffernan et al. 2016 |
| TbPO4 | 1.095 | Monazite | 138.8 | Li et al. (2009)§ |
| TbAsO4 | 1.04 | Zircon | 132 | Li et al. (2009)§ |
| DyPO4 | 1.083 | Monazite | 141.5 | Li et al. (2009)§ |
| DyAsO4 | 1.027 | Zircon | 134.8 | Li et al. (2009)§ |
| HoPO4 | 1.015 | Zircon | 143.3 | Li et al. (2009)§ |
| HoPO4 | 1.015 | Zircon | 152 | Gomis et al. (2017) |
| HoPO4 | 1.015 | Zircon | 146 | Gomis et al. (2017)§ |
| HoAsO4 | 1.015 | Zircon | 136.2 | Li et al. (2009)§ |
| ErPO4 | 1.004 | Zircon | 146.1 | Li et al. (2009)§ |
| ErPO4 | 1.004 | Zircon | 168 | Lacomba-Perales et al. (2010) |
| ErPO4-II | 1.004 | Monazite | 208 | Lacomba-Perales et al. (2010) |
| TmPO4 | 0.994 | Zircon | 147.2 | Li et al. (2009)§ |
| TmPO4 | 0.994 | Zircon | 144 | Gomis et al. (2017) |
| TmPO4 | 0.994 | Zircon | 142 | Gomis et al. (2017)§ |
| TmPO4 | 0.994 | Zircon | 120 | Bandiello et al. (2020) |
| TbPO4 | 0.994 | Zircon | 128 | López-Solano et al. (2010) |
| TbPO4 | 0.994 | Zircon | 144 | López-Solano et al. (2011)§ |
| TbPO4 | 0.994 | Zircon | 134 | López-Solano et al. (2012)§ |
| TbPO4-II | 1.052 | Monazite | 119 | López-Solano et al. (2010) |
| TbPO4-II | 1.052 | Monazite | 152 | López-Solano et al. (2011)§ |
| TbPO4-III | 0.994 | Scheelite | 152 | López-Solano et al. (2011)§ |
| TbPO4-IIII | 0.99 | BaWo4-II | 196 | López-Solano et al. (2011)§ |
| YbPO4 | 0.985 | Zircon | 150 | Li et al. (2009)§ |
| YbPO4 | 0.985 | Zircon | 150 | Zhang et al. (2008) |
| YbPO4-II | 0.985 | Scheelite |  | Zhang et al. (2008) |
| YbAsO4 | 0.985 | Zircon | 143.1 | Li et al. (2009)§ |
| LuPO4 | 0.977 | Zircon | 152.8 | Li et al. (2009)§ |
| LuPO4 | 0.977 | Zircon | 166 | Armbruster (1976) in Lacomba-Perales et al. (2010) |
| LuPO4 | 0.977 | Zircon | 184 | Zhang et al. (2008) |
| LuPO4-II | 0.977 | Scheelite | 226 | Zhang et al. (2008) |
| LuAsO4 | 0.977 | Zircon | 144.8 | Li et al. (2009)§ |
| BiPO4 | 1.17 | Monazite | 111.9 | Errandonea et al. (2018) |
| §Theoretical data | | | | |

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**Table S2**. Linear thermal expansion coefficients (LTEC) values reported in the literature for natural and synthetic *AT*O4 phosphates and arsenates, based on experimental and theoretical data.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | *A*-site  ionic radius  (Å) | Structure type | LTEC (x10-6 K-1) | Reference |
| ScPO4 | 0.87 | Zircon | 7 | Li et al. (2009)§ |
| ScPO4 | 0.87 | Zircon | 5.5 | Schopper (1972) |
| ScPO4 | 0.87 | Zircon | 5.5 | Subbarao et al. (1990) |
| ScAsO4 | 0.87 | Zircon | 6.9 | Li et al. (2009)§ |
| ScAsO4 | 0.87 | Zircon | 5.8 | Schopper (1972) |
| xenotime-(Y) | 1.021 | Zircon | 6.0 | This work |
| YPO4 | 1.019 | Zircon | 6.7 | Li et al. (2009)§ |
| YPO4 | 1.019 | Zircon | 5.5 | Subbarao (1968) |
| YPO4 | 1.019 | Zircon | 6.3 | Schopper (1972) |
| YPO4 | 1.019 | Zircon | 5.9 | Schopper (1972) |
| YPO4 | 1.019 | Zircon | 6.3 | Kahle (1970) |
| YPO4 | 1.019 | Zircon | 5.9 | Kahle (1970) |
| YPO4 | 1.019 | Zircon | 6.2 | Hikichi et al. (1998)\* |
| YPO4 | 1.019 | Zircon | 5.7 | Taylor (1986)\* |
| chernovite-(Y) | 1.023 | Zircon | 4.8 | this study |
| chernovite-(Y) | 1.023 | Zircon | 4.6 | this study |
| chernovite-(Y) | 1.053 | Zircon | 4.0 | this study |
| YAsO4 | 1.019 | Zircon | 6.6 | Li et al. (2009)§ |
| YAsO4 | 1.019 | Zircon | 6.3 | Schopper (1972) |
| YAsO4 | 1.019 | Zircon | 6.6 | Schopper (1972) |
| YAsO4 | 1.019 | Zircon | 6.2 | Kahle (1970) |
| YAsO4 | 1.019 | Zircon | 6.3 | Reddy et al. (1988) |
| YAsO4 | 1.019 | Zircon | 6.6 | Kahle (1970) |
| LaPO4 | 1.216 | Monazite | 10.3(5) | Perrière et al. (2007)\* |
| LaPO4 | 1.216 | Monazite | 7.8(3) | Thust et al. (2015)\* |
| LaPO4 | 1.216 | Monazite | 10 | Hikichi et al. (1998) |
| LaPO4 | 1.216 | Monazite | 7.5 | Morgan and Marshall (1995) |
| LaPO4 | 1.216 | Monazite | 10.5 | Morgan and Marshall (1995) |
| LaPO4 | 1.216 | Monazite | 9.6 | Morgan and Marshall (1995) |
| LaAsO4 | 1.216 | Monazite | 7.7 | Li et al. (2009)§ |
| monazite-(Ce) | 1.184 | Monazite | 9.7 | this study |
| CePO4 | 1.196 | Monazite | 7.7 | Li et al. (2009)§ |
| CePO4 | 1.196 | Monazite | 9.9 | Hikichi et al. (1998) |
| CePO4 | 1.196 | Monazite | 9.1 | Asuvathraman et al. (2014) |
| CePO4 | 1.193 | Monazite | 8.9 | Asuvathraman et al. (2014) |
| CeAsO4 | 1.196 | Monazite | 7.7 | Li et al. (2009)§ |
| PrPO4 | 1.179 | Monazite | 7.7 | Li et al. (2009)§ |
| PrPO4 | 1.179 | Monazite | 10.9(5) | Perrière et al. (2007)\* |
| NdPO4 | 1.163 | Monazite | 7.6 | Li et al. (2009)§ |
| NdPO4 | 1.163 | Monazite | 10.7(5) | Perrière et al. (2007)\* |
| NdPO4 | 1.163 | Monazite | 9.8 | Hikichi et al. (1998) |
| NdAsO4 | 1.163 | Monazite | 7.6 | Li et al. (2009)§ |
| SmPO4 | 1.132 | Monazite | 7.5 | Li et al. (2009)§ |
| SmPO4 | 1.132 | Monazite | 11(0.5) | Perrière et al. (2007)\* |
| SmPO4 | 1.132 | Monazite | 9.7 | Hikichi et al. (1998) |
| SmAsO4 | 1.079 | Zircon | 5.9 | Li et al. (2009)§ |
| EuPO4 | 1.12 | Monazite | 7.5 | Li et al. (2009)§ |
| EuPO4 | 1.12 | Monazite | 11.1(5) | Perrière et al. (2007)\* |
| EuPO4 | 1.12 | Monazite | 9.1(3) | Thust et al. (2015)\* |
| GdPO4 | 1.107 | Monazite | 7.5 | Li et al. (2009)§ |
| GdPO4 | 1.107 | Monazite | 11.4(5) | Perrière et al. (2007)\* |
| TbPO4 | 1.04 | Zircon | 5.9 | Li et al. (2009)§ |
| TbAsO4 | 1.04 | Zircon | 5.8 | Li et al. (2009)§ |
| DyPO4 | 1.027 | Zircon | 5.9 | Li et al. (2009)§ |
| DyAsO4 | 1.027 | Zircon | 5.8 | Li et al. (2009)§ |
| HoPO4 | 1.015 | Zircon | 5.8 | Li et al. (2009)§ |
| HoAsO4 | 1.015 | Zircon | 5.7 | Li et al. (2009)§ |
| ErPO4 | 1.004 | Zircon | 5.8 | Li et al. (2009)§ |
| ErPO4 | 1.004 | Zircon | 6 | Hikichi et al. (1998)\* |
| TmPO4 | 0.994 | Zircon | 5.8 | Li et al. (2009)§ |
| YbPO4 | 0.985 | Zircon | 5.8 | Li et al. (2009)§ |
| YbPO4 | 0.985 | Zircon | 6 | Hikichi et al. (1998)\* |
| YbAsO4 | 0.985 | Zircon | 5.7 | Li et al. (2009)§ |
| LuPO4 | 0.977 | Zircon | 5.7 | Li et al. (2009) |
| LuPO4 | 0.977 | Zircon | 6.2 | Hikichi et al. (1998)\* |
| LuPO4 | 0.977 | Zircon | 6.4 | Patwe et al. (2009) |
| LuAsO4 | 0.977 | Zircon | 5.6 | Li et al. (2009)§ |
| §Theoretical data; \*Experimental data from dilatometry analyses | | | | |

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**Table S3**. Unit-cell parameters from the *in situ* high-pressure experiments performed on the investigated samples of chernovite-(Y), xenotime-(Y) and monazite-(Ce). (See Table 2 for experimental details). Pressure uncertainty ≤ 0.05 GPa.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **chernovite-(Y)** | | | | | |
|  | | | | | |
| *P* (GPa) | *a* (Å) |  | *c* (Å) |  | *V* (Å3) |
|  |  |  |  |  |  |
| 0.0001 | 7.0380(3) |  | 6.2670(3) |  | 310.43(2) |
| 0.16 | 7.0350(2) |  | 6.2660(3) |  | 310.11(2) |
| 0.62 | 7.0250(2) |  | 6.2620(3) |  | 309.03(2) |
| 1.17 | 7.0150(2) |  | 6.2590(3) |  | 308.01(2) |
| 2.00 | 6.9972(2) |  | 6.2494(3) |  | 305.94(2) |
| 3.07 | 6.9761(2) |  | 6.2387(3) |  | 303.62(2) |
| 4.54 | 6.9495(2) |  | 6.2273(3) |  | 300.69(2) |
| 5.63 | 6.9334(2) |  | 6.2201(3) |  | 298.97(2) |
| 6.43 | 6.9188(2) |  | 6.2124(3) |  | 297.38(2) |
| 7.20 | 6.9040(2) |  | 6.2035(3) |  | 295.68(2) |
| 7.79 | 6.8939(2) |  | 6.2011(3) |  | 294.71(2) |
| 8.86 | 6.8786(2) |  | 6.1900(3) |  | 292.83(2) |
| 10.16 | 6.8607(3) |  | 6.1803(3) |  | 290.83(2) |
| 10.71 | 6.8512(8) |  | 6.1744(7) |  | 289.70(4) |
|  |  |  |  |  |  |
| **(Ca,Th)-enriched chernovite-(Y)** | | | | | |
|  |  |  |  |  |  |
| *P* (GPa) | *a* (Å) |  | *c* (Å) |  | *V* (Å3) |
|  |  |  |  |  |  |
| 0.0001 | 7.0780(4) |  | 6.3095(7) |  | 316.09(4) |
| 0.69 | 7.0675(4) |  | 6.3034(6) |  | 314.86(4) |
| 0.96 | 7.0577(4) |  | 6.2956(7) |  | 313.59(4) |
| 1.24 | 7.0473(4) |  | 6.2958(4) |  | 312.68(4) |
| 1.52 | 7.0502(4) |  | 6.2935(7) |  | 312.82(4) |
| 1.80 | 7.0380(4) |  | 6.2881(4) |  | 311.47(3) |
| 2.54 | 7.0273(5) |  | 6.2857(5) |  | 310.40(4) |
| 2.76 | 7.0193(5) |  | 6.2907(8) |  | 309.94(4) |
| 3.25 | 7.0088(4) |  | 6.2795(7) |  | 308.47(4) |
| 3.63 | 7.0033(4) |  | 6.2769(8) |  | 307.86(4) |
| 3.82 | 6.9946(5) |  | 6.2740(7) |  | 306.95(4) |
| 4.06 | 6.9952(4) |  | 6.2589(6) |  | 306.27(4) |
| 4.20 | 6.9867(6) |  | 6.2631(9) |  | 305.73(6) |
| 4.62 | 6.9825(4) |  | 6.2674(4) |  | 305.57(3) |
| 4.87 | 6.9763(6) |  | 6.2613(9) |  | 304.73(5) |
| 5.11 | 6.9708(6) |  | 6.2611(7) |  | 304.24(5) |
| 5.25 | 6.9663(6) |  | 6.2565(9) |  | 303.62(5) |
| 5.76 | 6.9588(6) |  | 6.2513(7) |  | 302.72(5) |
| 6.05 | 6.9539(6) |  | 6.2475(7) |  | 302.10(5) |
| 6.19 | 6.9515(4) |  | 6.2516(4) |  | 302.09(4) |
| 6.34 | 6.9497(5) |  | 6.2467(8) |  | 301.71(4) |
| 6.62 | 6.9432(5) |  | 6.2481(5) |  | 301.21(4) |
| 6.91 | 6.9384(5) |  | 6.2452(4) |  | 300.66(3) |
| 7.18 | 6.9358(5) |  | 6.2448(6) |  | 300.41(4) |
| 7.48 | 6.9259(5) |  | 6.2409(4) |  | 299.37(4) |
| 7.66 | 6.9276(4) |  | 6.2355(6) |  | 299.25(3) |
| 7.92 | 6.9253(4) |  | 6.2352(9) |  | 299.04(4) |
| 8.20 | 6.9130(3) |  | 6.2325(4) |  | 297.84(3) |
| 4.40\* | 6.9884(6) |  | 6.2594(8) |  | 305.69(5) |
| 3.40\* | 7.0051(5) |  | 6.2800(8) |  | 308.17(4) |
| 2.31\* | 7.0324(5) |  | 6.2843(7) |  | 310.79(4) |
| 1.97\* | 7.0369(4) |  | 6.2897(5) |  | 311.46(4) |
| 0.43\* | 7.0709(5) |  | 6.3040(6) |  | 315.19(4) |
| \*Data collected in decompression | | | | | |
|  |  |  |  |  |  |
| **Xenotime-(Y)** | | | | | |
|  |  |  |  |  |  |
| *P* (GPa) | *a* (Å) | *b* (Å) | *c* (Å) | *β* (°) | *V* (Å3) |
|  |  |  |  |  |  |
| 0.22 | 6.9176(3) |  | 6.0644(2) |  | 290.20(2) |
| 0.57 | 6.9108(3) |  | 6.0612(2) |  | 289.48(2) |
| 1.23 | 6.8970(2) |  | 6.0569(1) |  | 288.118(13) |
| 2.00 | 6.8808(2) |  | 6.0501(1) |  | 286.444(13) |
| 2.83 | 6.8652(2) |  | 6.0437(2) |  | 284.845(15) |
| 3.8 | 6.8499(2) |  | 6.0368(1) |  | 283.253(13) |
| 4.99 | 6.8293(2) |  | 6.0279(1) |  | 281.137(13) |
| 5.84 | 6.8159(2) |  | 6.0220(2) |  | 279.761(15) |
| 6.53 | 6.8043(2) |  | 6.0161(1) |  | 278.536(12) |
| 7.40 | 6.7924(2) |  | 6.0101(1) |  | 277.286(12) |
| 8.26 | 6.7800(2) |  | 6.0044(1) |  | 276.013(12) |
| 8.74 | 6.7731(2) |  | 6.0007(1) |  | 275.281(12) |
| 9.88 | 6.7549(2) |  | 5.9907(1) |  | 273.348(12) |
| 10.73 | 6.7455(2) |  | 5.9859(1) |  | 272.369(12) |
| 11.73 | 6.7356(2) |  | 5.9818(1) |  | 271.384(12) |
| 12.69 | 6.7219(3) |  | 5.9743(2) |  | 269.94(2) |
| 13.71 | 6.7073(2) |  | 5.9658(2) |  | 268.389(14) |
| 14.83 | 6.6924(2) |  | 5.9551(2) |  | 266.718(14) |
| 15.72 | 6.6814(2) |  | 5.9494(2) |  | 265.588(14) |
| 16.74 | 6.6677(2) |  | 5.9424(2) |  | 264.189(14) |
| 17.95§ | 6.368(8) | 6.5558(12) | 6.1322(14) | 103.67(6) | 248.8(3) |
| 18.79§ | 6.343(7) | 6.5530(11) | 6.1430(12) | 103.56(5) | 248.2(3) |
| 19.97§ | 6.303(8) | 6.5333(12) | 6.1177(13) | 103.37(6) | 245.1(3) |
| 20.55§ | 6.347(8) | 6.5219(12) | 6.1138(13) | 103.45(6) | 246.1(3) |
| 21.41§ | 6.300(7) | 6.5158(10) | 6.1101(11) | 103.39(5) | 244.0(3) |
| 22.39§ | 6.298(10) | 6.5008(12) | 6.0999(14) | 103.37(7) | 243.0(4) |
| 23.31§ | 6.290(13) | 6.489(2) | 6.097(2) | 103.39(8) | 242.1(5) |
| 24.48§ | 6.278(10) | 6.489(2) | 6.085(2) | 103.30(7) | 241.2(4) |
| 25.51§ | 6.252(9) | 6.4890(13) | 6.087(2) | 103.03(6) | 240.6(4) |
| 26.63§ | 6.241(8) | 6.4656(13) | 6.0716(14) | 103.09(6) | 238.6(3) |
| 27.68§ | 6.234(10) | 6.4639(14) | 6.075(2) | 103.02(7) | 238.5(4) |
| 28.74§ | 6.213(9) | 6.4451(13) | 6.0591(13) | 102.91(6) | 236.5(4) |
| 30.38§ | 6.219(9) | 6.4574(12) | 6.0699(12) | 102.91(6) | 237.6(4) |
| 19.30§\* | 6.361(11) | 6.548(2) | 6.134(2) | 103.66(8) | 248.3(5) |
| 15.28§\* | 6.384(9) | 6.5873(11) | 6.172(2) | 103.76(7) | 252.1(4) |
| 11.03§\* | 6.441(8) | 6.6278(7) | 6.1977(13) | 103.90(6) | 256.0(3) |
| 6.15§\* | 6.505(7) | 6.6923(7) | 6.2462(12) | 104.01(5) | 263.0(3) |
| 1.32\* | 6.9360(7) |  | 6.1090(6) |  | 293.80(5) |
| 0.0001\* | 6.9204(4) |  | 6.0638(3) |  | 292.10(5) |
| \*Data collected in decompression;  §Data pertaining to the high-pressure polymorph xenotime-(Y)-II | | | | | |
|  |  |  |  |  |  |
| **Monazite-(Ce)** | | | | | |
|  |  |  |  |  |  |
| *P* (GPa) | *a* (Å) | *b* (Å) | *c* (Å) | *β* (°) | *V* (Å3) |
|  |  |  |  |  |  |
| 0.0001 | 6.7878(5) | 7.0034(13) | 6.4691(3) | 103.554(6) | 298.96(6) |
| 0.77(5) | 6.7685(9) | 6.987(2) | 6.4602(4) | 103.422(9) | 297.20(10) |
| 1.98(5) | 6.7466(4) | 6.9784(8) | 6.4473(2) | 103.391(5) | 295.29(4) |
| 2.73(5) | 6.7173(4) | 6.9572(10) | 6.4298(2) | 103.299(5) | 292.43(5) |
| 3.99(5) | 6.6927(5) | 6.9391(14) | 6.4139(3) | 103.186(7) | 290.02(6) |
| 4.99(5) | 6.6815(5) | 6.9271(13) | 6.4073(3) | 103.113(7) | 288.82(6) |
| 6.35(5) | 6.6487(4) | 6.9018(10) | 6.3894(2) | 103.002(5) | 285.68(5) |
| 7.56(5) | 6.6331(4) | 6.8854(9) | 6.3836(2) | 102.930(5) | 284.16(4) |
| 9.38(5) | 6.5895(5) | 6.8555(12) | 6.3531(3) | 102.720(6) | 279.95(6) |
| 9.98(5) | 6.5882(5) | 6.8588(11) | 6.3557(3) | 102.693(6) | 280.18(5) |
| 12.86(5) | 6.5214(5) | 6.8039(12) | 6.3095(3) | 102.359(6) | 273.47(5) |
| 14.08(5) | 6.5059(4) | 6.7862(12) | 6.2988(3) | 102.317(6) | 271.69(5) |
| 15.45(5) | 6.4910(6) | 6.779(2) | 6.2907(4) | 102.274(9) | 270.48(7) |
| 16.67(5) | 6.4737(7) | 6.763(2) | 6.2777(4) | 102.208(10) | 268.63(8) |
| 18.36(5) | 6.4480(8) | 6.751(2) | 6.2630(5) | 102.063(11) | 266.61(9) |
| 19.42(5) | 6.4113(9) | 6.736(3) | 6.2394(5) | 101.788(13) | 263.78(13) |
| 21.50(5) | 6.3866(11) | 6.708(3) | 6.2177(7) | 101.58(2) | 260.95(13) |
| 23.50(5) | 6.3529(13) | 6.669(4) | 6.2039(6) | 101.28(2) | 257.8(2) |

**Table S4**. High-pressure evolution of relevant structural parameters of the investigated samples of chernovite-(Y), xenotime-(Y) and monazite-(Ce). Pressure uncertainty ≤ 0.05 GPa.

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Th-poor chernovite-(Y)** | | | | | | | | | | | | |
|  |  |  |  |  |  |  |  |  |  |  |  |  |
| *P* (GPa) | *VT*O4 (Å3) | *VA*O8,9 (Å3) | *A*-O1a (Å) | *A*-O1b (Å) |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |
| 0.0001 | 2.31(2) | 23.56(3) | 2.416(3) | 2.303(3) |  |  |  |  |  |  |  |  |
| 0.16 | 2.34(2) | 23.46(3) | 2.419(4) | 2.294(5) |  |  |  |  |  |  |  |  |
| 0.62 | 2.34(2) | 23.32(3) | 2.415(4) | 2.289(4) |  |  |  |  |  |  |  |  |
| 1.17 | 2.31(2) | 23.32(3) | 2.412(4) | 2.291(5) |  |  |  |  |  |  |  |  |
| 2.00 | 2.31(2) | 23.14(3) | 2.411(4) | 2.281(4) |  |  |  |  |  |  |  |  |
| 3.07 | 2.29(2) | 22.97(3) | 2.408(3) | 2.273(4) |  |  |  |  |  |  |  |  |
| 4.54 | 2.28(2) | 22.70(3) | 2.401(3) | 2.263(4) |  |  |  |  |  |  |  |  |
| 5.63 | 2.28(2) | 22.56(3) | 2.402(3) | 2.254(3) |  |  |  |  |  |  |  |  |
| 6.43 | 2.28(2) | 22.39(3) | 2.398(3) | 2.247(3) |  |  |  |  |  |  |  |  |
| 7.20 | 2.27(2) | 22.23(3) | 2.391(4) | 2.242(4) |  |  |  |  |  |  |  |  |
| 7.79 | 2.26(2) | 22.20(3) | 2.392(4) | 2.239(4) |  |  |  |  |  |  |  |  |
| 8.86 | 2.26(2) | 22.01(3) | 2.388(3) | 2.231(4) |  |  |  |  |  |  |  |  |
| 10.16 | 2.25(2) | 21.82(3) | 2.382(4) | 2.223(4) |  |  |  |  |  |  |  |  |
| 10.71 | 2.24(2) | 21.76(3) | 2.382(4) | 2.220(5) |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |
| **Xenotime-(Y) and its high-*P* polymorph xenotime-(Y)-II** | | | | | | | | | | | | |
|  |  |  |  |  |  |  |  |  |  |  |  |  |
| *P* (GPa) | *VT*O4 (Å3) | *VA*O8,9 (Å3) | *A*-O1a (Å) | *A*-O1b (Å) | *A*-O2a  (Å) | *A*-O2b (Å) | *A*-O2c (Å) | *A*-O3a (Å) | *A*-O3b (Å) | *A*-O4a (Å) | *A*-O4b (Å) | *A*-O3c (Å) |
|  |  |  |  |  |  |  |  |  |  |  |  |  |
| 0.22 | 1.908(7) | 23.28(1) | 2.311(3) | 2.388(3) |  |  |  |  |  |  |  |  |
| 0.57 | 1.898(7) | 23.26(1) | 2.310(5) | 2.388(4) |  |  |  |  |  |  |  |  |
| 1.23 | 1.902(7) | 23.09(1) | 2.302(3) | 2.385(3) |  |  |  |  |  |  |  |  |
| 2.00 | 1.889(7) | 22.98(1) | 2.297(3) | 2.384(3) |  |  |  |  |  |  |  |  |
| 2.83 | 1.890(7) | 22.81(1) | 2.289(4) | 2.380(4) |  |  |  |  |  |  |  |  |
| 3.80 | 1.881(7) | 22.68(1) | 2.283(4) | 2.378(3) |  |  |  |  |  |  |  |  |
| 4.99 | 1.878(7) | 22.48(1) | 2.273(3) | 2.376(3) |  |  |  |  |  |  |  |  |
| 5.84 | 1.878(7) | 22.35(1) | 2.265(4) | 2.375(3) |  |  |  |  |  |  |  |  |
| 6.53 | 1.874(7) | 22.23(1) | 2.261(4) | 2.371(3) |  |  |  |  |  |  |  |  |
| 7.40 | 1.885(7) | 22.07(1) | 2.251(5) | 2.371(4) |  |  |  |  |  |  |  |  |
| 8.26 | 1.884(7) | 21.95(1) | 2.245(6) | 2.370(5) |  |  |  |  |  |  |  |  |
| 8.74 | 1.873(7) | 21.91(1) | 2.244(3) | 2.367(3) |  |  |  |  |  |  |  |  |
| 9.88 | 1.840(7) | 21.82(1) | 2.245(4) | 2.360(3) |  |  |  |  |  |  |  |  |
| 10.73 | 1.845(7) | 21.73(1) | 2.237(4) | 2.362(3) |  |  |  |  |  |  |  |  |
| 11.73 | 1.861(7) | 21.55(1) | 2.228(4) | 2.359(3) |  |  |  |  |  |  |  |  |
| 12.69 | 1.862(7) | 21.41(1) | 2.220(4) | 2.358(4) |  |  |  |  |  |  |  |  |
| 13.71 | 1.846(7) | 21.30(1) | 2.218(6) | 2.352(5) |  |  |  |  |  |  |  |  |
| 14.83 | 1.836(7) | 21.18(1) | 2.211(5) | 2.351(4) |  |  |  |  |  |  |  |  |
| 15.72 | 1.829(7) | 21.06(1) | 2.208(5) | 2.345(4) |  |  |  |  |  |  |  |  |
| 16.74 | 1.831(7) | 20.93(1) | 2.200(5) | 2.345(4) |  |  |  |  |  |  |  |  |
| 17.95 | 1.5(3) | 26.3(4) | 2.39(3) | 2.23(3) | 2.69(4) | 2.46(10) | 2.27(5) | 2.36(6) | 2.27(6) | 2.44(6) | 2.38(3) | 3.12(6) |
| 18.79 | 1.9(2) | 25.9(4) | 2.38(3) | 2.26(2) | 2.69(2) | 2.47(5) | 2.26(3) | 2.45(5) | 2.32(4) | 2.34(3) | 2.20(5) | 2.92(5) |
| 19.97 | 1.8(2) | 25.7(4) | 2.34(3) | 2.27(2) | 2.68(3) | 2.49(7) | 2.22(3) | 2.46(6) | 2.32(5) | 2.34(2) | 2.23(5) | 2.86(5) |
| 20.55 | 1.8(3) | 25.6(4) | 2.39(5) | 2.26(4) | 2.72(4) | 2.40(9) | 2.26(5) | 2.39(7) | 2.33(8) | 2.34(3) | 2.23(7) | 3.02(8) |
| 21.41 | 1.8(2) | 25.7(4) | 2.33(3) | 2.26(2) | 2.70(3) | 2.46(6) | 2.24(3) | 2.45(5) | 2.33(5) | 2.31(3) | 2.24(6) | 2.86(5) |
| 22.39 | 1.7(3) | 25.3(4) | 2.32(2) | 2.28(2) | 2.68(2) | 2.34(5) | 2.32(3) | 2.38(4) | 2.34(3) | 2.33(2) | 2.27(4) | 2.93(4) |
| 23.31 | 1.8(2) | 25.5(4) | 2.36(3) | 2.24(3) | 2.68(3) | 2.54(8) | 2.21(4) | 2.44(6) | 2.26(5) | 2.33(3) | 2.17(5) | 2.88(6) |
| 24.48 | 1.8(3) | 24.8(4) | 2.31(3) | 2.25(2) | 2.66(3) | 2.34(5) | 2.29(3) | 2.42(5) | 2.36(5) | 2.28(3) | 2.23(6) | 2.86(6) |
| 25.51 | 1.8(2) | 25.0(4) | 2.32(3) | 2.27(2) | 2.67(2) | 2.42(6) | 2.23(3) | 2.38(5) | 2.32(5) | 2.33(2) | 2.22(4) | 2.91(5) |
| 26.63 | 1.7(3) | 24.9(4) | 2.36(3) | 2.22(3) | 2.65(3) | 2.29(4) | 2.26(7) | 2.41(7) | 2.40(7) | 2.27(3) | 2.30(7) | 2.86(8) |
| 27.68 | 1.7(2) | 24.8(4) | 2.31(3) | 2.24(2) | 2.66(3) | 2.35(7) | 2.26(3) | 2.42(5) | 2.29(5) | 2.30(2) | 2.30(6) | 2.86(5) |
| 28.74 | 1.7(2) | 24.5(4) | 2.29(3) | 2.23(2) | 2.65(3) | 2.34(6) | 2.27(3) | 2.43(5) | 2.27(5) | 2.30(2) | 2.27(6) | 2.82(5) |
| 30.38 | 1.8(2) | 24.4(4) | 2.33(3) | 2.22(2) | 2.65(2) | 2.28(6) | 2.28(3) | 2.43(6) | 2.29(6) | 2.31(2) | 2.26(6) | 2.83(6) |
|  |  |  |  |  |  |  |  |  |  |  |  |  |
| **Monazite-(Ce)** | | | | | | | | | | | | |
|  |  |  |  |  |  |  |  |  |  |  |  |  |
| *P* (GPa) | *VT*O4 (Å3) | *VA*O8,9 (Å3) | *A*-O1a (Å) | *A*-O1b (Å) | *A*-O2a (Å) | *A*-O2b (Å) | *A*-O2c (Å) | *A*-O3a (Å) | *A*-O3b (Å) | *A*-O4a (Å) | *A*-O4b (Å) | *A*-O3c (Å) |
|  |  |  |  |  |  |  |  |  |  |  |  |  |
| 0.0001 | 1.85(1) | 32.39(3) | 2.516(6) | 2.453(8) | 2.791(6) | 2.558(7) | 2.637(6) | 2.581(6) | 2.472(8) | 2.517(5) | 2.461(6) | 3.175(7) |
| 1.98 | 1.86(1) | 31.82(3) | 2.508(6) | 2.436(7) | 2.773(6) | 2.535(7) | 2.623(6) | 2.581(6) | 2.456(7) | 2.503(4) | 2.444(6) | 3.144(6) |
| 2.73 | 1.84(1) | 31.53(3) | 2.491(5) | 2.430(7) | 2.766(5) | 2.527(6) | 2.608(5) | 2.580(5) | 2.456(6) | 2.503(4) | 2.441(4) | 3.122(5) |
| 3.99 | 1.82(1) | 31.33(3) | 2.490(5) | 2.424(6) | 2.758(4) | 2.512(5) | 2.595(4) | 2.579(4) | 2.463(6) | 2.496(4) | 2.432(4) | 3.089(5) |
| 4.99 | 1.84(1) | 31.13(3) | 2.484(4) | 2.417(5) | 2.753(4) | 2.512(5) | 2.588(4) | 2.580(4) | 2.450(5) | 2.491(4) | 2.428(4) | 3.085(5) |
| 6.35 | 1.82(1) | 30.73(3) | 2.479(4) | 2.404(5) | 2.738(4) | 2.500(5) | 2.578(4) | 2.581(4) | 2.448(5) | 2.483(4) | 2.417(4) | 3.054(5) |
| 7.56 | 1.82(1) | 30.63(3) | 2.480(6) | 2.396(7) | 2.737(5) | 2.500(6) | 2.566(6) | 2.579(6) | 2.444(7) | 2.466(4) | 2.402(5) | 3.040(6) |
| 9.38 | 1.81(1) | 30.23(3) | 2.451(5) | 2.396(7) | 2.734(5) | 2.469(6) | 2.549(5) | 2.576(5) | 2.455(6) | 2.470(4) | 2.395(5) | 2.992(6) |
| 9.98 | 1.87(1) | 29.83(3) | 2.469(12) | 2.37(2) | 2.76(2) | 2.43(2) | 2.52(2) | 2.58(2) | 2.46(2) | 2.46(2) | 2.39(2) | 2.97(2) |
| 12.86 | 1.81(1) | 29.33(3) | 2.438(5) | 2.369(7) | 2.708(5) | 2.438(6) | 2.523(5) | 2.568(5) | 2.437(6) | 2.452(4) | 2.368(5) | 2.933(6) |
| 14.08 | 1.80(1) | 29.23(3) | 2.435(5) | 2.366(7) | 2.705(5) | 2.429(6) | 2.518(5) | 2.566(5) | 2.442(6) | 2.441(4) | 2.366(4) | 2.917(5) |
| 15.45 | 1.80(1) | 29.03(3) | 2.430(6) | 2.365(7) | 2.698(5) | 2.429(6) | 2.510(5) | 2.566(5) | 2.434(6) | 2.438(4) | 2.359(5) | 2.910(6) |
| 16.67 | 1.80(1) | 28.87(3) | 2.429(6) | 2.358(7) | 2.696(5) | 2.413(6) | 2.503(6) | 2.565(5) | 2.435(6) | 2.431(4) | 2.353(5) | 2.888(6) |
| 18.36 | 1.79(1) | 28.69(3) | 2.422(6) | 2.352(8) | 2.689(6) | 2.406(7) | 2.498(5) | 2.561(5) | 2.437(7) | 2.421(5) | 2.352(5) | 2.870(6) |
| 19.42 | 1.81(1) | 28.29(3) | 2.413(9) | 2.335(9) | 2.690(8) | 2.386(8) | 2.483(9) | 2.550(7) | 2.427(9) | 2.420(6) | 2.342(7) | 2.846(8) |
| 21.50 | 1.77(1) | 28.14(3) | 2.395(8) | 2.359(7) | 2.683(8) | 2.376(9) | 2.473(7) | 2.552(7) | 2.424(9) | 2.406(6) | 2.340(7) | 2.818(8) |
| 23.50 | 1.76(1) | 27.81(3) | 2.389(7) | 2.349(10) | 2.680(6) | 2.369(8) | 2.456(6) | 2.543(6) | 2.419(7) | 2.408(8) | 2.389(9) | 2.794(7) |

|  |  |  |  |
| --- | --- | --- | --- |
|  | (Ca,Th)-poor chernovite-(Y) | (Ca,Th)-rich  chernovite-(Y) | Xenotime-(Y) |
| *a*0 (Å) | 7.0379(4) | 7.0790(8) | 6.918(2) |
| *Ma*0 (GPa) | 338(2) | 307(3) | 366(5) |
| *βa0* (GPa-1) | 0.00296(2) | 0.00326(3) | 0.00273(4) |
| *c*0 (Å) | 6.2678(5) | 3.3097(11) | 6.0675(8) |
| *Mc*0 (GPa) | 668(8) | 622(15) | 726(8) |
| *βa0* (GPa-1) | 0.00150(2) | 0.00161(4) | 0.00138(2) |

**Table S5.** Refined II-order Birch-Murnaghan equation of state parameters based on the fits of the *a*-*P* and *c*-*P* unit-cell experimental data of the investigated zircon structural type minerals.

**Table S6**. Bond-valence (Brown et al. 2002) values of the single *A*-*O* bonds, calculated from selected structure refinements of the monazite-(Ce) high-pressure experiment using the tools implemented in the *Vesta3* software. Pressure uncertainty ≤ 0.05 GPa.

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *P* (GPa) | *A*-*O*1a | *A*-*O*1b | *A*-*O*2a | *A*-*O*2b | *A*-*O*2c | *A*-*O*3a | *A*-*O*3b | *A*-*O*4a | *A*-*O*4b | *A*-*O*3c |
| 0.0001 | 0.37 | 0.44 | 0.18 | 0.33 | 0.27 | 0.31 | 0.42 | 0.37 | 0.43 | 0.06 |
| 3.99 | 0.40 | 0.47 | 0.19 | 0.38 | 0.30 | 0.31 | 0.43 | 0.39 | 0.47 | 0.08 |
| 9.38 | 0.44 | 0.51 | 0.21 | 0.42 | 0.34 | 0.32 | 0.44 | 0.43 | 0.51 | 0.10 |
| 14.08 | 0.46 | 0.56 | 0.22 | 0.47 | 0.37 | 0.33 | 0.45 | 0.46 | 0.56 | 0.13 |
| 16.67 | 0.47 | 0.57 | 0.23 | 0.49 | 0.38 | 0.33 | 0.46 | 0.47 | 0.58 | 0.14 |
| 18.36 | 0.48 | 0.58 | 0.23 | 0.50 | 0.39 | 0.33 | 0.46 | 0.48 | 0.58 | 0.14 |
| 19.42 | 0.49 | 0.60 | 0.23 | 0.53 | 0.41 | 0.34 | 0.47 | 0.48 | 0.60 | 0.15 |
| 21.50 | 0.52 | 0.57 | 0.24 | 0.54 | 0.42 | 0.34 | 0.48 | 0.50 | 0.60 | 0.17 |
| 23.50 | 0.53 | 0.59 | 0.24 | 0.55 | 0.44 | 0.35 | 0.48 | 0.50 | 0.64 | 0.18 |
| Reference parameters for BV calculations:  *A*-*O* bonds (Ce-O) – Brese N.E. and O’Keeffe M. (1991) Acta Crystallografica B, 47, 192-197. | | | | | | | | | | |

**Table S7**. Unit-cell parameters from the *in situ* high-temperature experiments performed on the investigated samples of chernovite-(Y), xenotime-(Y) and monazite-(Ce). (See Table 2 for experimental details). Temperature uncertainty ≤ 5 °C.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Th-poor chernovite-(Y)** | | | | | |
|  | | | | | |
| *T* (°C) | *a* (Å) |  | *c* (Å) |  | *V* (Å3) |
|  |  |  |  |  |  |
| 106 | 7.0187(14) |  | 6.2385(11) |  | 307.32(10) |
| 182 | 7.0200(14) |  | 6.2407(11) |  | 307.54(10) |
| 258 | 7.0220(14) |  | 6.2433(11) |  | 307.85(10) |
| 334 | 7.0239(14) |  | 6.2478(12) |  | 308.24(11) |
| 410 | 7.0265(14) |  | 6.2491(12) |  | 308.53(11) |
| 486 | 7.0294(14) |  | 6.2515(12) |  | 308.90(11) |
| 526 | 7.031(2) |  | 6.2540(12) |  | 309.15(11) |
| 638 | 7.033(2) |  | 6.2583(12) |  | 309.53(11) |
| 714 | 7.035(2) |  | 6.2633(12) |  | 309.98(11) |
| 790 | 7.037(2) |  | 6.2669(12) |  | 310.30(11) |
|  |  |  |  |  |  |
| **Th-rich chernovite-(Y)** | | | | | |
|  |  |  |  |  |  |
| *T* (°C) | *a* (Å) |  | *c* (Å) |  | *V* (Å3) |
|  |  |  |  |  |  |
| 30 | 7.0518(3) |  | 6.2901(3) |  | 313.08(2) |
| 100 | 7.0545(3) |  | 6.2916(3) |  | 313.27(2) |
| 200 | 7.0571(3) |  | 6.2953(3) |  | 313.52(2) |
| 300 | 7.0581(3) |  | 6.3001(3) |  | 313.85(2) |
| 400 | 7.0606(3) |  | 6.3037(3) |  | 314.26(2) |
| 500 | 7.0644(3) |  | 6.3052(3) |  | 314.66(2) |
| 600 | 7.0665(3) |  | 6.3095(3) |  | 315.07(2) |
| 700 | 7.0700(3) |  | 6.3113(3) |  | 315.48(2) |
| 800 | 7.0702(3) |  | 6.3184(3) |  | 315.85(2) |
| 900 | 7.0738(3) |  | 6.3194(3) |  | 316.22(2) |
| 1000 | 7.0766(3) |  | 6.3225(3) |  | 316.62(2) |
|  |  |  |  |  |  |
| **Xenotime-(Y)** | | | | | |
|  |  |  |  |  |  |
| *T* (°C) | *a* (Å) |  | *c* (Å) |  | *V* (Å3) |
|  |  |  |  |  |  |
| 30 | 6.8970(2) |  | 6.0553(1) |  | 288.04(2) |
| 106 | 6.8993(2) |  | 6.0585(1) |  | 288.39(2) |
| 182 | 6.9014(9) |  | 6.0608(8) |  | 288.67(7) |
| 258 | 6.9044(9) |  | 6.0629(8) |  | 289.02(7) |
| 334 | 6.9066(9) |  | 6.0656(8) |  | 289.34(7) |
| 410 | 6.9087(9) |  | 6.0698(8) |  | 289.71(7) |
| 486 | 6.9124(9) |  | 6.0728(8) |  | 290.16(7) |
| 526 | 6.9155(9) |  | 6.0759(8) |  | 290.57(7) |
| 638 | 6.9191(9) |  | 6.0791(8) |  | 291.03(7) |
| 714 | 6.9227(9) |  | 6.0821(8) |  | 291.48(7) |
| 790 | 6.9265(9) |  | 6.0870(8) |  | 292.03(7) |
|  |  |  |  |  |  |
| **Monazite-(Ce)** | | | | | |
|  |  |  |  |  |  |
| *T* (°C) | *a* (Å) | *b* (Å) | *c* (Å) | *β* (°) | *V* (Å3) |
|  |  |  |  |  |  |
| 30 | 6.7795(5) | 7.0058(5) | 6.4543(5) | 103.551(6) | 298.02(4) |
| 106 | 6.7835(5) | 7.0089(5) | 6.4572(5) | 103.534(6) | 298.48(4) |
| 182 | 6.7867(5) | 7.0124(5) | 6.4621(5) | 103.535(6) | 299.00(4) |
| 258 | 6.7926(5) | 7.0159(5) | 6.4676(5) | 103.544(6) | 299.65(4) |
| 334 | 6.7970(5) | 7.0200(5) | 6.4734(5) | 103.537(6) | 300.30(4) |
| 410 | 6.8029(5) | 7.0236(5) | 6.4793(5) | 103.535(6) | 300.99(4) |
| 486 | 6.8076(5) | 7.0278(5) | 6.4842(5) | 103.552(6) | 301.58(4) |
| 526 | 6.8139(5) | 7.0325(5) | 6.4912(5) | 103.551(6) | 302.39(4) |
| 638 | 6.8184(5) | 7.0351(5) | 6.4961(5) | 103.577(6) | 302.90(4) |
| 714 | 6.8245(5) | 7.0406(5) | 6.5034(5) | 103.560(6) | 303.77(4) |
| 790 | 6.8313(5) | 7.0454(5) | 6.5105(5) | 103.565(6) | 304.60(4) |

**Table S8**. High-temperature evolution of relevant structural parameters of the investigated samples of chernovite-(Y), xenotime-(Y) and monazite-(Ce). Temperature uncertainty ≤ 5 °C.

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Th-poor chernovite-(Y)** | | | | | | | | | | | | |
|  |  |  |  |  |  |  |  |  |  |  |  |  |
| *T* (°C) | *VT*O4 (Å3) | *VA*O8,9 (Å3) | *A*-O1a (Å) | *A*-O1b (Å) |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |
| 106 | 2.305(8) | 23.51(3) | 2.283(14) | 2.437(13) |  |  |  |  |  |  |  |  |
| 182 | 2.307(8) | 23.52(3) | 2.283(14) | 2.438(13) |  |  |  |  |  |  |  |  |
| 258 | 2.275(8) | 23.58(3) | 2.296(10) | 2.426(11) |  |  |  |  |  |  |  |  |
| 334 | 2.35(2) | 23.67(5) | 2.26(3) | 2.48(2) |  |  |  |  |  |  |  |  |
| 410 | 2.283(8) | 23.70(3) | 2.295(12) | 2.434(12) |  |  |  |  |  |  |  |  |
| 486 | 2.278(8) | 23.78(3) | 2.295(14) | 2.443(13) |  |  |  |  |  |  |  |  |
| 526 | 2.348(8) | 23.36(3) | 2.288(15) | 2.418(13) |  |  |  |  |  |  |  |  |
| 638 | 2.27(2) | 23.80(4) | 2.30(3) | 2.44(2) |  |  |  |  |  |  |  |  |
| 714 | 2.311(8) | 23.80(3) | 2.290(15) | 2.45(2) |  |  |  |  |  |  |  |  |
| 790 | 2.253(8) | 23.92(3) | 2.309(12) | 2.435(11) |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |
| **Xenotime-(Y)** | | | | | | | | | | | | |
|  |  |  |  |  |  |  |  |  |  |  |  |  |
| *T* (°C) | *VT*O4 (Å3) | *VA*O8,9 (Å3) | *A*-O1a (Å) | *A*-O1b (Å) |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |
| 30 | 1.911(6) | 23.04(5) | 2.383(2) | 2.300(3) |  |  |  |  |  |  |  |  |
| 106 | 1.919(6) | 23.05(5) | 2.385(3) | 2.300(3) |  |  |  |  |  |  |  |  |
| 182 | 1.904(6) | 23.15(5) | 2.387(3) | 2.303(3) |  |  |  |  |  |  |  |  |
| 258 | 1.912(6) | 23.16(5) | 2.389(3) | 2.303(3) |  |  |  |  |  |  |  |  |
| 334 | 1.903(6) | 23.20(5) | 2.386(3) | 2.308(3) |  |  |  |  |  |  |  |  |
| 410 | 1.908(6) | 23.26(5) | 2.390(3) | 2.309(3) |  |  |  |  |  |  |  |  |
| 486 | 1.903(6) | 23.31(5) | 2.391(3) | 2.311(3) |  |  |  |  |  |  |  |  |
| 526 | 1.900(6) | 23.37(5) | 2.393(3) | 2.313(3) |  |  |  |  |  |  |  |  |
| 638 | 1.900(6) | 23.41(5) | 2.393(3) | 2.315(3) |  |  |  |  |  |  |  |  |
| 714 | 1.910(6) | 23.46(5) | 2.396(3) | 2.316(3) |  |  |  |  |  |  |  |  |
| 790 | 1.915(6) | 23.49(5) | 2.400(3) | 2.314(3) |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |
| **Monazite-(Ce)** | | | | | | | | | | | | |
|  |  |  |  |  |  |  |  |  |  |  |  |  |
| *T* (°C) | *VT*O4 (Å3) | *VA*O8,9 (Å3) | *A*-O1a (Å) | *A*-O1b (Å) | *A*-O2a (Å) | *A*-O2b (Å) | *A*-O2c (Å) | *A*-O3a (Å) | *A*-O3b (Å) | *A*-O4a (Å) | *A*-O4b (Å) |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |
| 30 | 1.85(5) | 32.23(9) | 2.503(2) | 2.460(2) | 2.781(2) | 2.554(3) | 2.638(3) | 2.577(3) | 2.465(3) | 2.512(3) | 2.455(3) |  |
| 106 | 1.85(5) | 32.28(9) | 2.504(2) | 2.461(2) | 2.782(2) | 2.556(2) | 2.639(3) | 2.578(2) | 2.466(2) | 2.514(3) | 2.457(2) |  |
| 182 | 1.85(5) | 32.33(9) | 2.506(2) | 2.463(2) | 2.784(2) | 2.557(2) | 2.641(3) | 2.580(2) | 2.467(2) | 2.516(3) | 2.458(2) |  |
| 258 | 1.86(5) | 32.40(9) | 2.508(2) | 2.464(2) | 2.786(2) | 2.558(2) | 2.643(3) | 2.582(2) | 2.469(2) | 2.518(3) | 2.460(2) |  |
| 334 | 1.86(5) | 32.47(9) | 2.510(2) | 2.465(3) | 2.789(2) | 2.560(2) | 2.645(3) | 2.584(2) | 2.470(2) | 2.520(3) | 2.462(2) |  |
| 410 | 1.87(5) | 32.55(9) | 2.512(2) | 2.467(2) | 2.791(2) | 2.561(2) | 2.647(3) | 2.586(2) | 2.472(2) | 2.523(3) | 2.464(2) |  |
| 486 | 1.87(5) | 32.61(9) | 2.514(2) | 2.468(2) | 2.793(2) | 2.563(2) | 2.648(3) | 2.589(2) | 2.474(2) | 2.524(3) | 2.465(2) |  |
| 526 | 1.87(5) | 32.70(9) | 2.516(2) | 2.470(2) | 2.796(2) | 2.565(2) | 2.651(3) | 2.591(2) | 2.476(2) | 2.527(3) | 2.467(2) |  |
| 638 | 1.88(5) | 32.76(9) | 2.518(2) | 2.471(2) | 2.797(2) | 2.566(2) | 2.652(3) | 2.594(2) | 2.477(2) | 2.528(3) | 2.469(2) |  |
| 714 | 1.88(5) | 32.85(9) | 2.521(2) | 2.473(2) | 2.801(2) | 2.568(2) | 2.655(3) | 2.596(2) | 2.479(2) | 2.532(3) | 2.471(2) |  |
| 790 | 1.89(5) | 32.94(9) | 2.523(2) | 2.474(2) | 2.803(2) | 2.570(2) | 2.658(3) | 2.599(2) | 2.481(2) | 2.534(3) | 2.473(2) |  |