Supporting information for Phase Transition of Layered Titanate under Supercritical N, N-dimethylformamide and Supercritical Water

Figure S1 Sediment XRD of H\textsubscript{1.07}Ti\textsubscript{1.73}O\textsubscript{4}·H\textsubscript{2}O was treated by subcritical and supercritical water (2 h, 10 ml) with temperature. Anatase, and K\textsubscript{2}Ti\textsubscript{6}O\textsubscript{13} designated by the ● and ◆, respectively.

Figure S2 SEM of sediment of H\textsubscript{1.07}Ti\textsubscript{1.73}O\textsubscript{4}·H\textsubscript{2}O was treated by supercritical water (400 °C, 2 h, 10 ml)
Figure S3 XRD patterns (a) the calcination of H$_{1.07}$Ti$_{1.73}$O$_4$·H$_2$O under air (180 °C, 30 min), inset shows the enlarge images; (b) the calcination of H$_{1.07}$Ti$_{1.73}$O$_4$·H$_2$O under air (400 °C); (c) the calcination of H$_{1.07}$Ti$_{1.73}$O$_4$·H$_2$O under air (500 °C); (d) the calcination of H$_{1.07}$Ti$_{1.73}$O$_4$·H$_2$O under air (600 °C); H$_{1.07}$Ti$_{1.73}$O$_4$·H$_2$O layered structure, anatase, and K$_2$Ti$_6$O$_{13}$, designated by the □, ●, and ◆, respectively.
Figure S4 SEM images of $\text{H}_{1.07}\text{Ti}_{1.73}\text{O}_4\cdot\text{H}_2\text{O}$ was treated by calcination under air condition ($400\,^\circ\text{C}$, 2 h).

Fig. S3.a shows the XRD of heat treated sample under air ($180\,^\circ\text{C}$, 30 min). From the enlarge image, we can observe that the strong layered peak ($2\theta=9.8\,^\circ$) becomes weak and shifts into high angle ($2\theta=11.6\,^\circ$). This result confirms that the interlayer distance becomes small and dehydration happens. The SEM of $\text{H}_{1.07}\text{Ti}_{1.73}\text{O}_4\cdot\text{H}_2\text{O}$ treated by calcination is shown in Fig. S4. From the SEM images, we find that the morphology of product was transformed from layered into rods. The distance between interlayer (cross section) disappeared due to dehydration. This phenomenon accords with the XRD results, and it confirms the dehydration process is underway. Fig. S3 b, c, d shows the temperature and time effect on the phase transition of $\text{H}_{1.07}\text{Ti}_{1.73}\text{O}_4\cdot\text{H}_2\text{O}$ under air. When the temperature is higher than $400\,^\circ\text{C}$, the layered peak ($2\theta=9.8\,^\circ$) disappeared and the anatase ($2\theta=25.2\,^\circ$) formed.