Fig. S1. X-ray diffraction patterns and the microphotographs of the surface of CaCu\(_{3-3x}\)Ni\(_{3x}\)Ti\(_4\)O\(_{12}\) (a, c) and CaCu\(_{3-x}\)Ti\(_{4-4x}\)Ni\(_{4x}\)O\(_{12-δ}\) (b, d) at \(x=0.06\) (a, b) and 0.03 (c, d).

Fig. S2. EDS-spectrum and the microphotograph of the CaCu\(_{3-3x}\)Ni\(_{3x}\)Ti\(_4\)O\(_{12}\) at \(x=0.06\).
Fig. S3. EDS-spectrum and the microphotograph of the $\text{CaCu}_3\text{Ti}_{4x}\text{Ni}_{12-5}\text{O}_{12}$ at $x = 0.06$.

Fig. S4. TG and DSC curves of the $\text{CaCu}_{2.91}\text{Ni}_{0.09}\text{Ti}_4\text{O}_{12}$ in the range of 293 – 723 K.
Fig. S5. Comparison of FTIR spectra of the CCTO, CaCu_{3-x}Ni_{x}Ti_{4}O_{12} and CaCu_{4-x}Ni_{4x}O_{12-δ} (x = 0.03) samples calcinated at a temperature of 723 K for 180 min with samples stored in the air (298 K).

Fig. S6. The mass spectrum for CaCu_{3-x}Ni_{x}Ti_{4}O_{12} (x = 0.03).