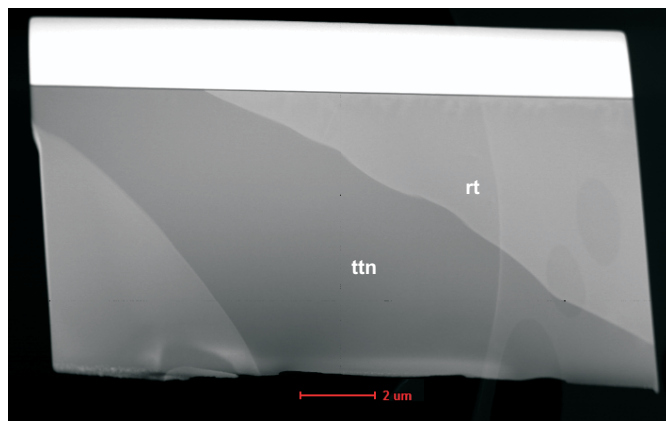
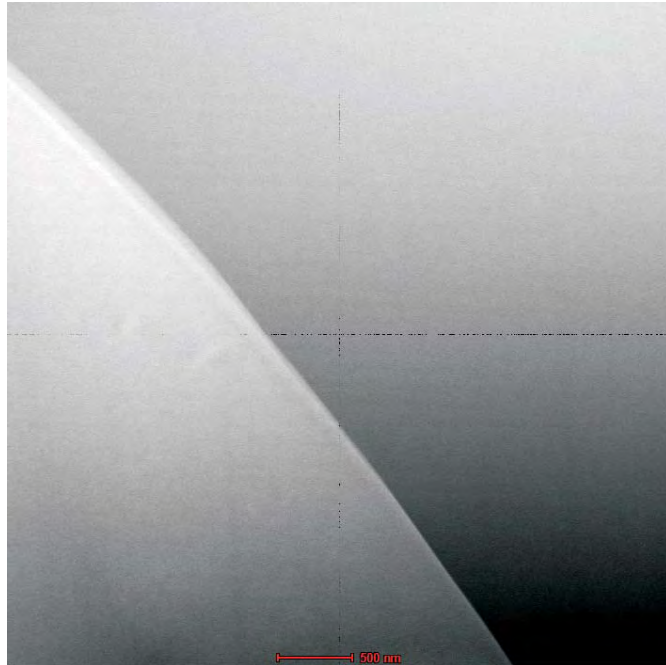


## Appendix Figure 2

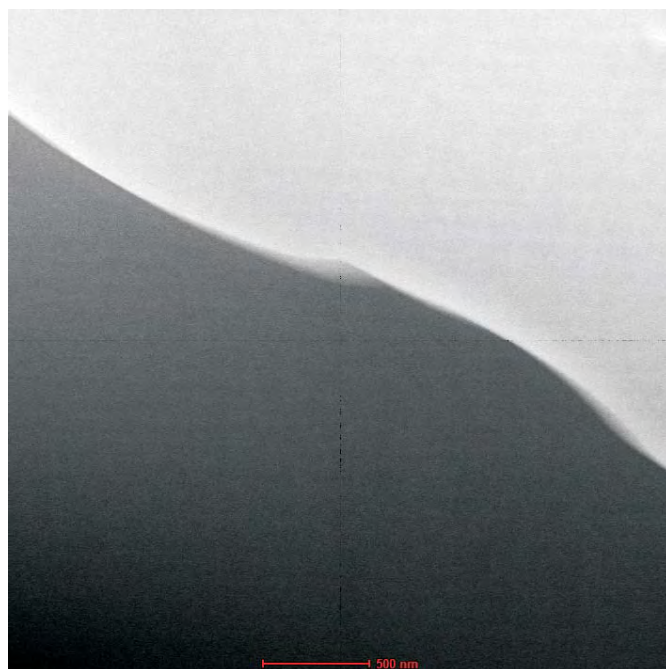
TEM images



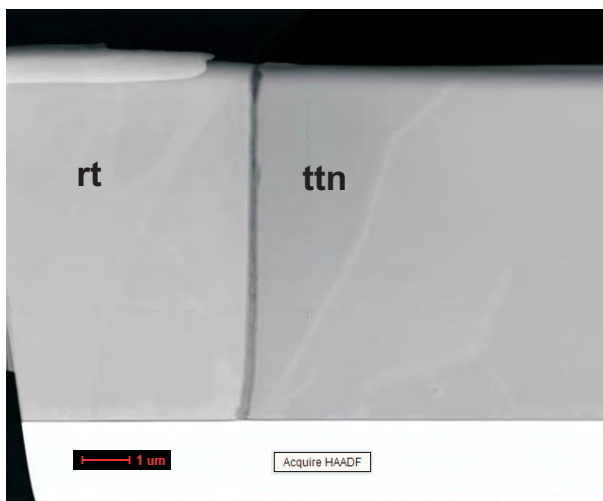
overview



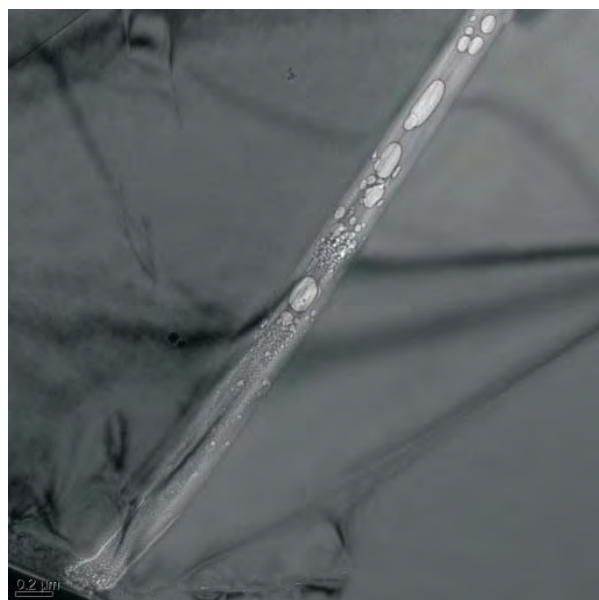
examples of tight grain boundaries



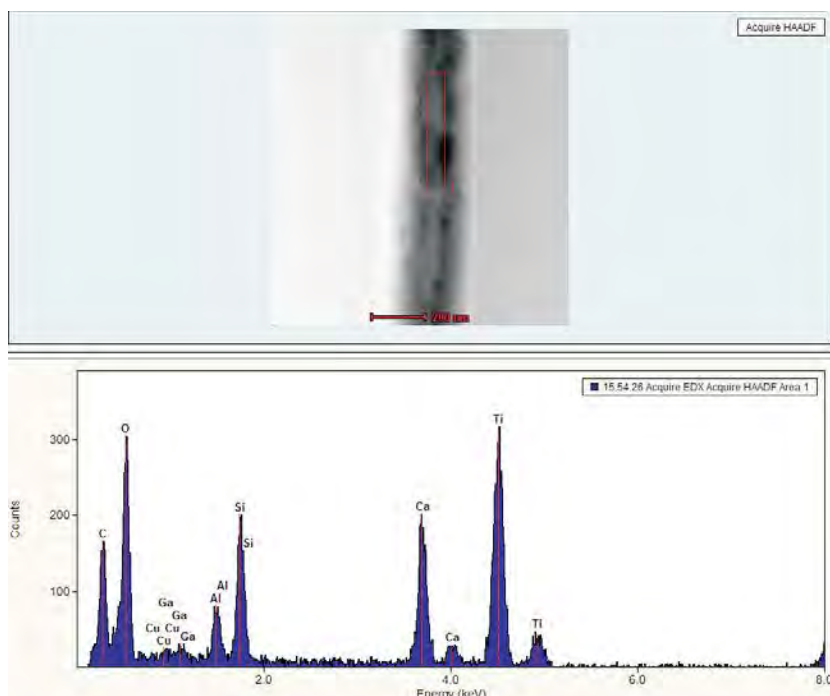
Ttn2 (7d) rutile (rt) - titanite interface: closed grain boundary (TEM foil # 1931)



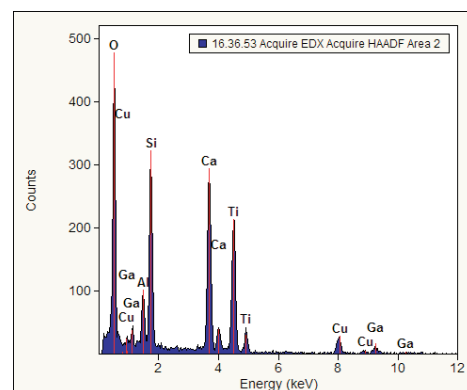
overview



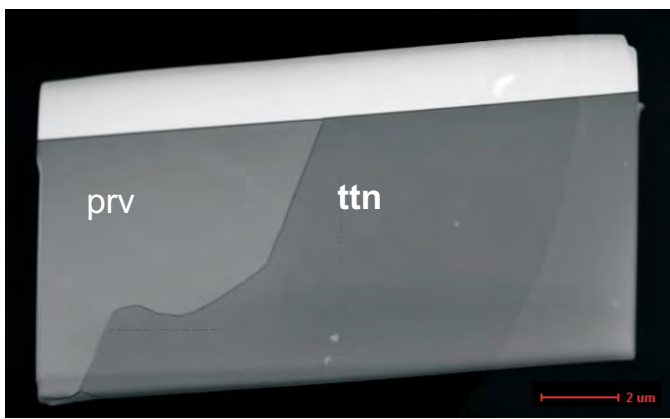
Diffraction contrast patterns end at the grain boundary that is filled with an amorphous phase containing pores (plasmon image).



Element spectrum of area 1 in the amorphous phase at the titanite - rutile interface. A spectrum of titanite from the same sample is shown for comparison.



Ttn2 (7d) rutile (rt) - titanite interface: open grain boundary with amorphous phase and pores (TEM foil #1927)

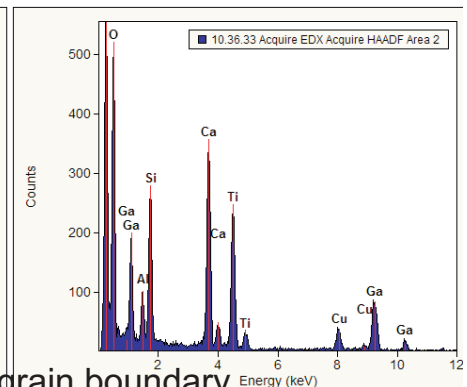
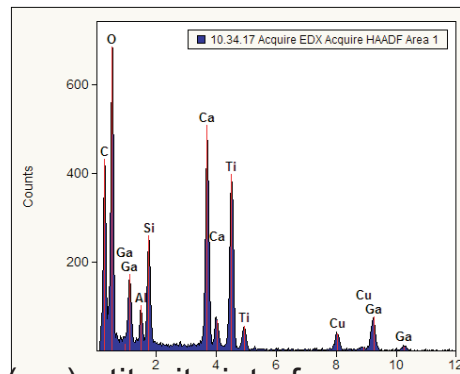
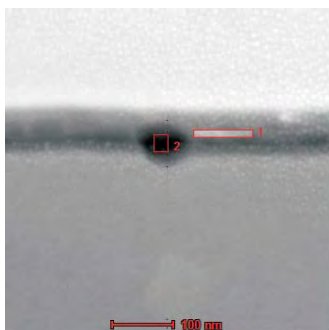
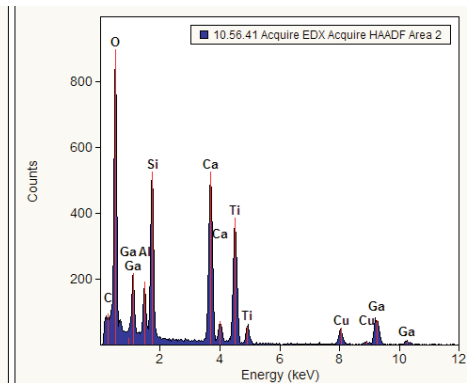
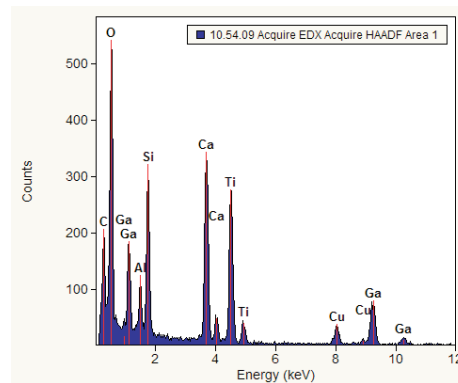
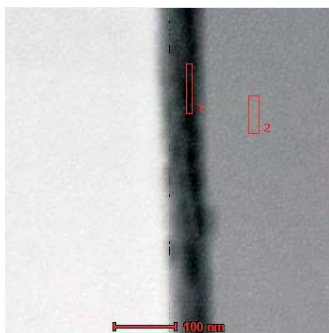


overview



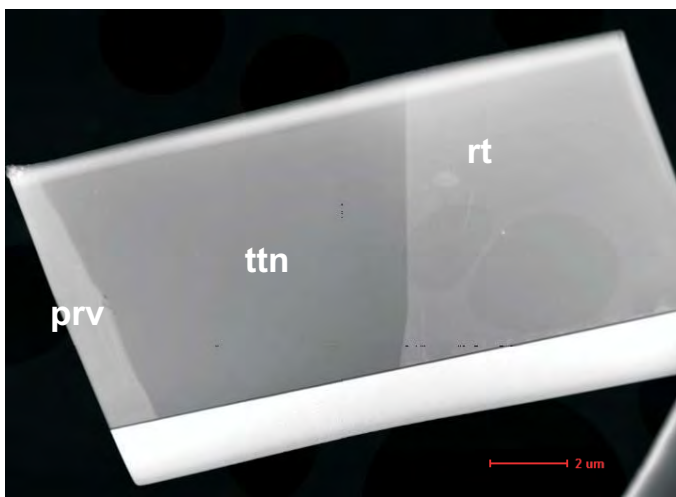
Diffraction contrast patterns end at the grain boundaries, The interface is filled with an amorphous phase that contains pores (bubbles).

below: upper panel shows element spectra of the amorphous phase (1) and titanite (2); lower panel shows element spectra of the amorphous phase (1,2)

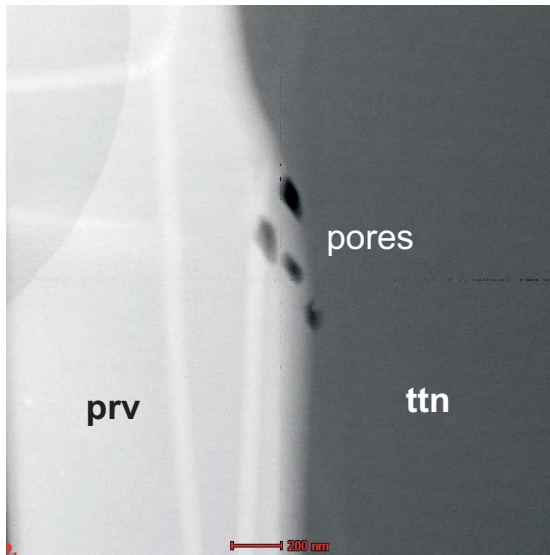


Ttn12 (14d) perovskite (prv) - titanite (ttn) interface: open grain boundary with amorphous phase and pores (TEM foil #1932)

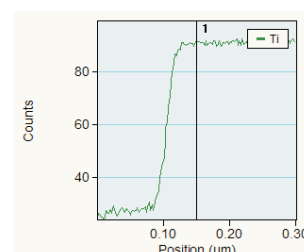
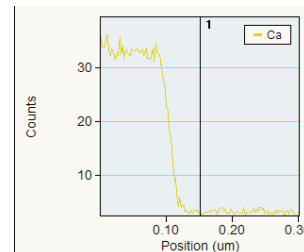
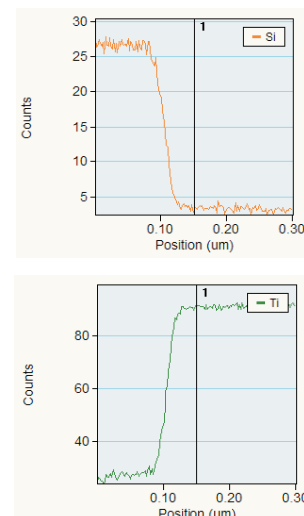
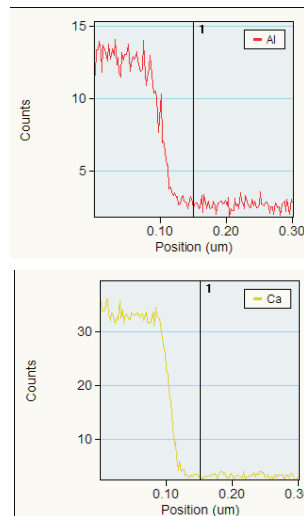
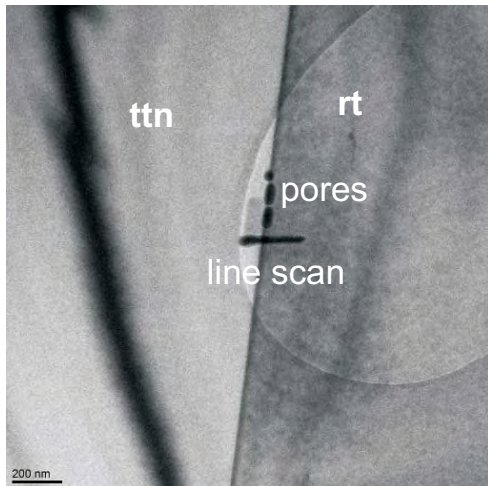




overview

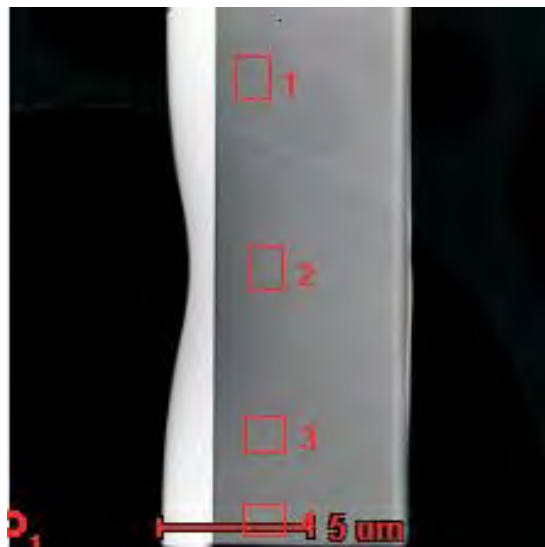


interface between perovskite and titanite; the grain boundary is partly tight indicated by the diffraction contrast (image on the right); the black dots (left image) are interpreted as pores at the interface.

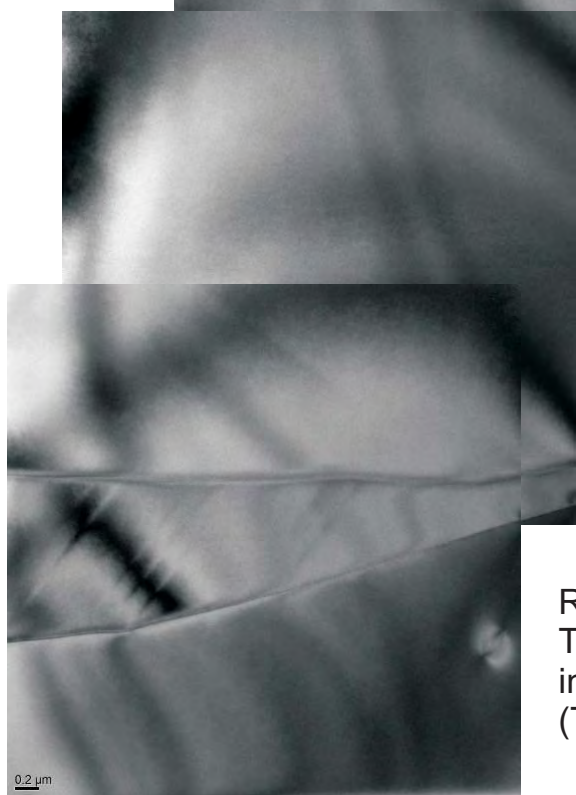


Interface between titanite and rutile is tight as indicated by the diffraction contrast (image on the left); the black dots (left image) are interpreted as pores at the interface. A line scan shows a smooth transition between the element contents of titanite and rutile.

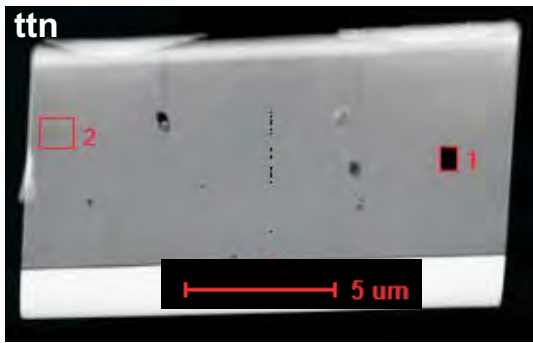
Ttn12 (14d) perovskite (prv) - titanite - rutile interface: (TEM foil #1934)



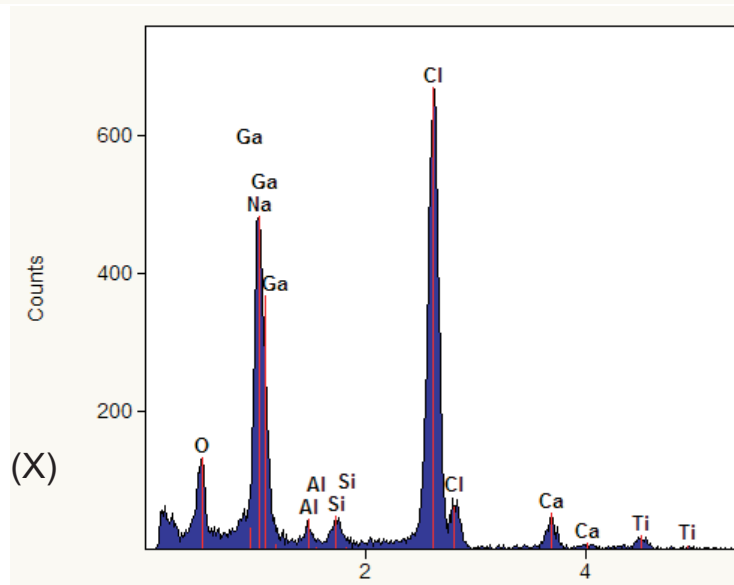
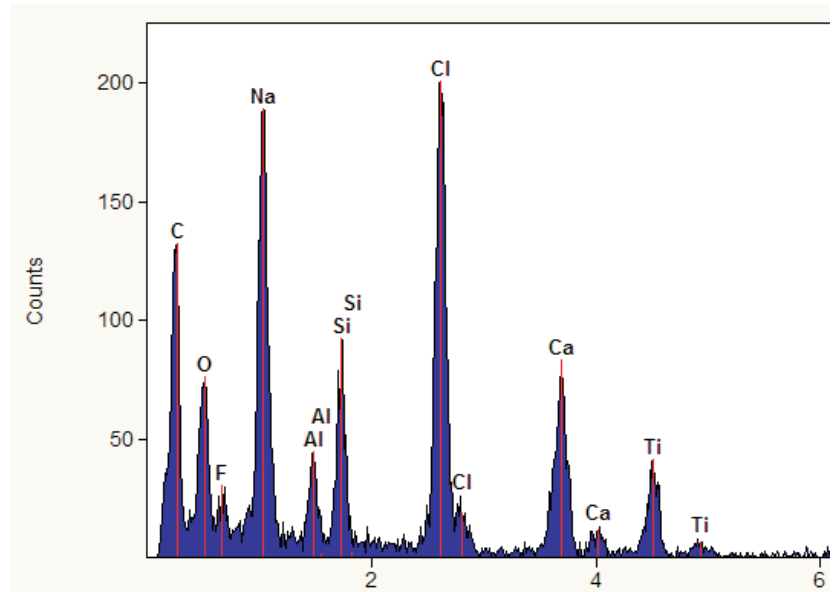
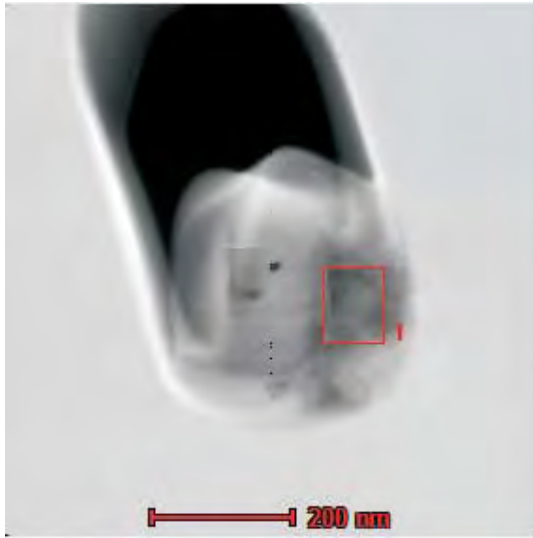
overview



RT17 (60d) Series of 4 TEM images over a chemical Ti-Al zoning in titanite. The diffraction contrast indicates no change in the structure of the titanite. (TEM foil #1934).



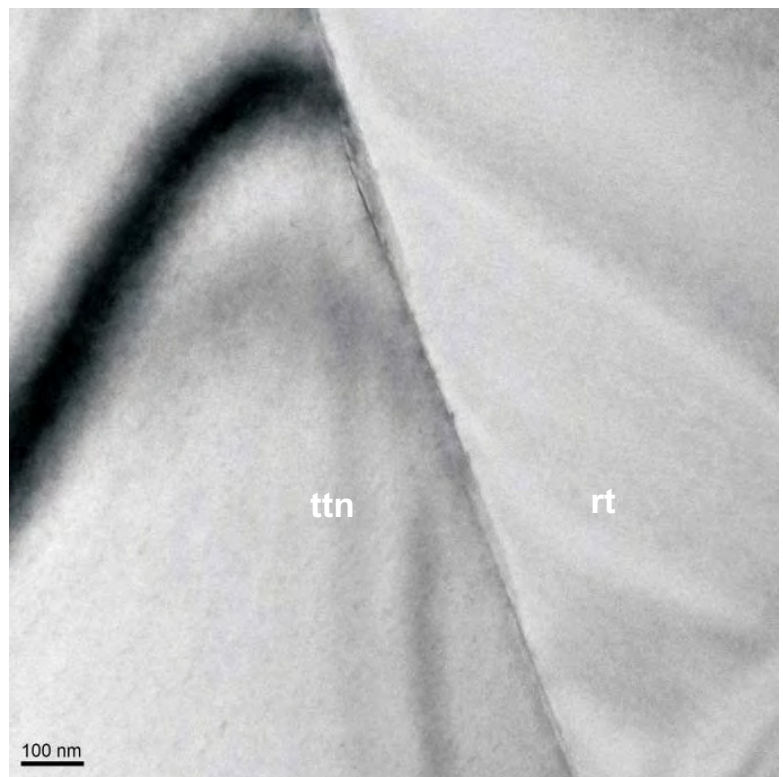
overview titanite



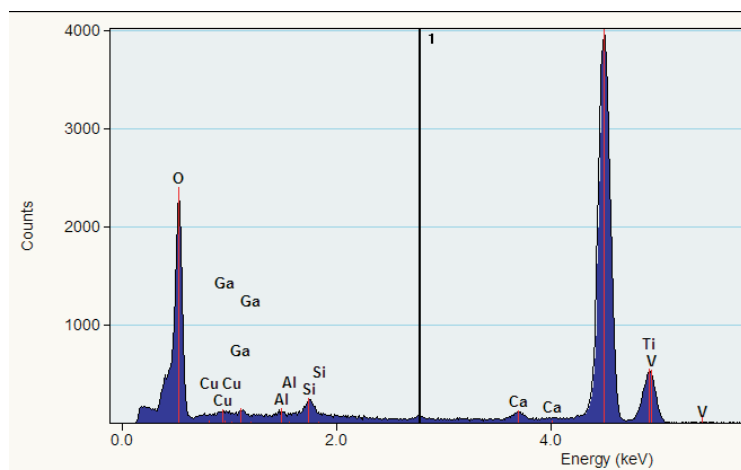
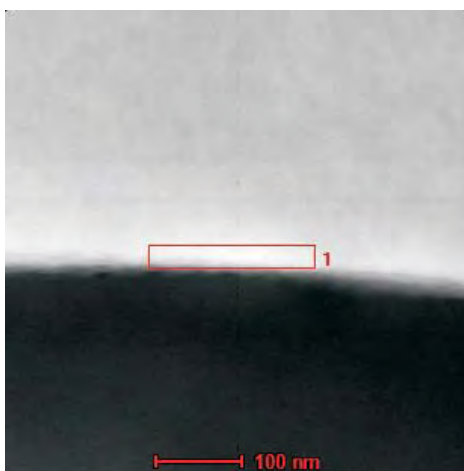
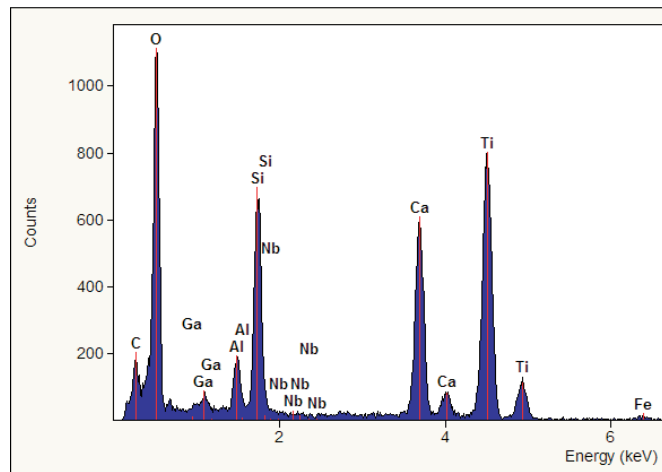
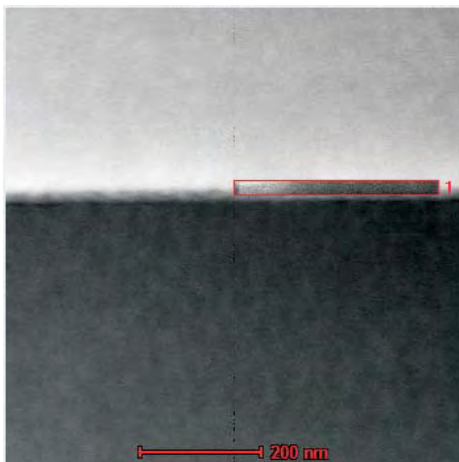
RT17 (60d) Partly filled pores at titanite - titanite grain boundaries. (TEM foil #1937)



overview



closed grain boundary between titanite and rutile;  
the diffraction patterns terminate at the grain boundary



RT17 (60d) analyses by EDX close to the grain boundary  
reveal either titanite (upper panel) or rutile (lower panel)