Correlative Raman spectroscopy and focused ion beam for targeted phase boundary análisis of Titania polymorphs

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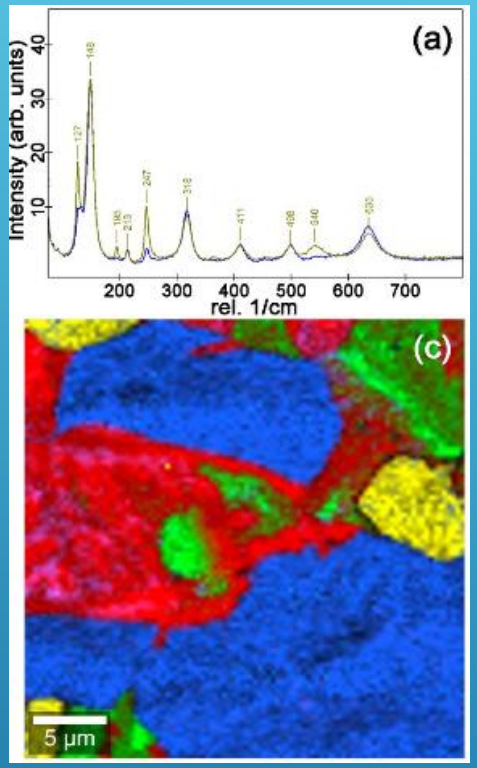
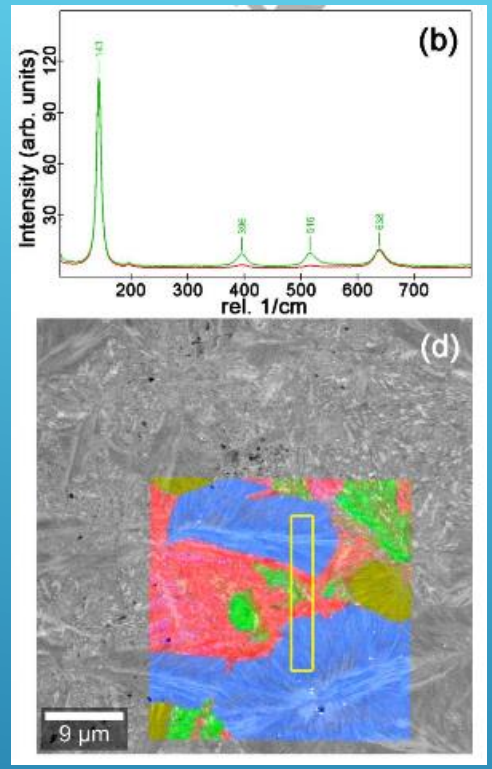
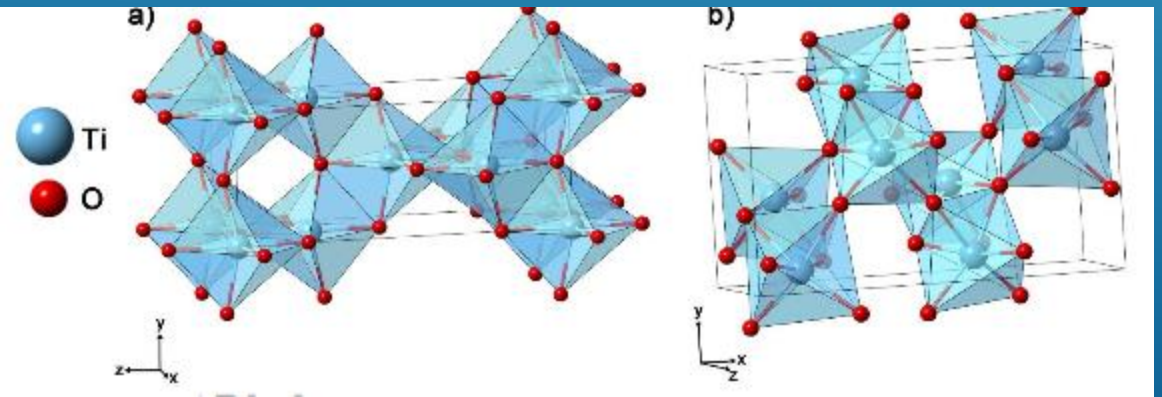
- Titanium dioxide films were prepared using pulsed layer deposition over a glass substrate. Resulting films were characterized using Raman spectroscopy to correlate deposition areas to specific Titania polymorphs being brookite and anatase the most relevant phases. Spectra was obtained using a WiTec confocal Raman and a 532nm excitation line.



The difference between the spectra of different Titania polymorphs allows to map and differentiate areas with different composition, in the figure brookite is colored yellow or blue and anatase with green and red.



A Raman spectra mapping was collected from an area with different structures to determine if there was a correlation between structure and spectra. Overlaying these maps on SEM images gives an accurate idea of possible boundaries between the polymorphs.



Since anatase and brookite are two chemical and structural alike compounds common techniques for their differentiation such as EDS and EBDS usually can´t differ between each other with enough resolution to determine their distribution on a material.

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