## SUPPLEMENTAL DATA

The common twin formation mode in face centered cubic crystals during recrystallization, known as annealing twins (Mahajan *et al.* 1997), is a misorientation of 60◦ about the $< 111 >$ axis according to Brandon's criteria (Brandon 1996 and Lin *et al.* 2014). Figure 7 shows the peak energy gradient and FWHM variation across a twinned grain from a different XRD experiment at higher incident X-ray energy. The diffraction peaks display qualitatively similar behavior to the results presented in Figure 6. The orientation of this grain was measured using EBSD and confirms that the twinning all occurs about the $< 111 >$ family of reciprocal lattice directions. All of the reflections display an increase in FWHM and magnitude of the gradient of peak position around these twin boundaries which is indicative of increased lattice rotation due to misorientation at the parent-twin boundary.

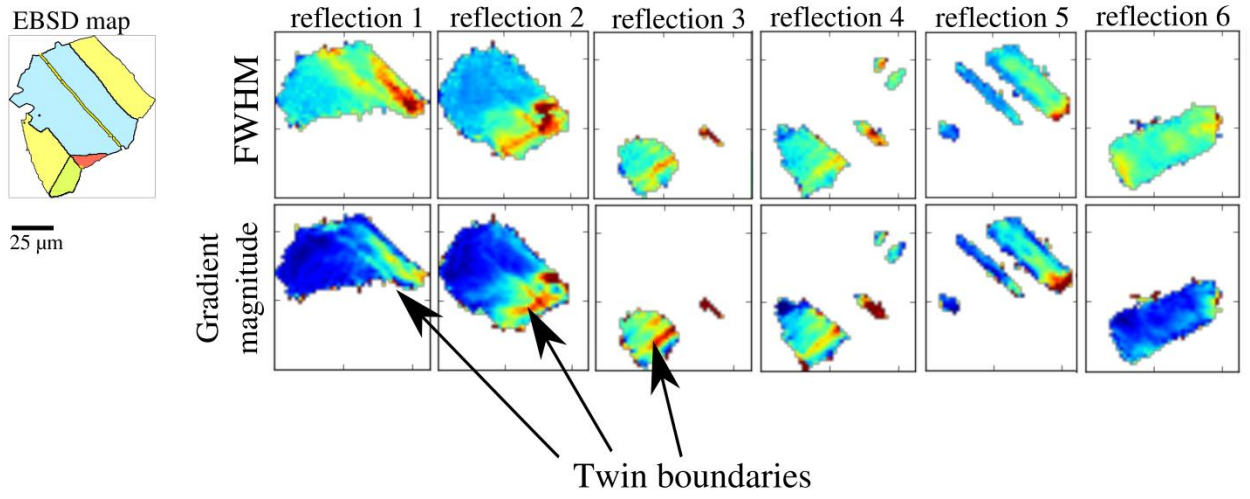


**Figure 7.** The orientation determined using EBSD for a single grain in a different experiment. The yellow and red areas of the EBSD map are all annealing twins, a rotation of 60° about the common $< 111 >$ reciprocal lattice directions. The discrepancies in grain size between the EBSD and XRD maps arise from the difference in the measured volume since EBSD only probes the surface (≈10 nm) while XRD probes the full thickness (15 μm in this case).

## References


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