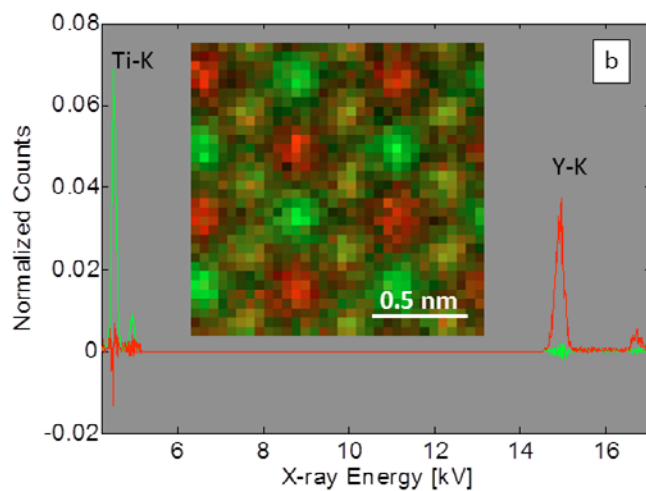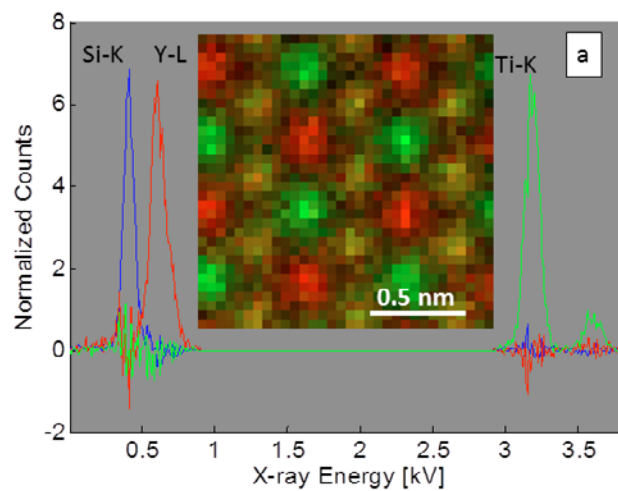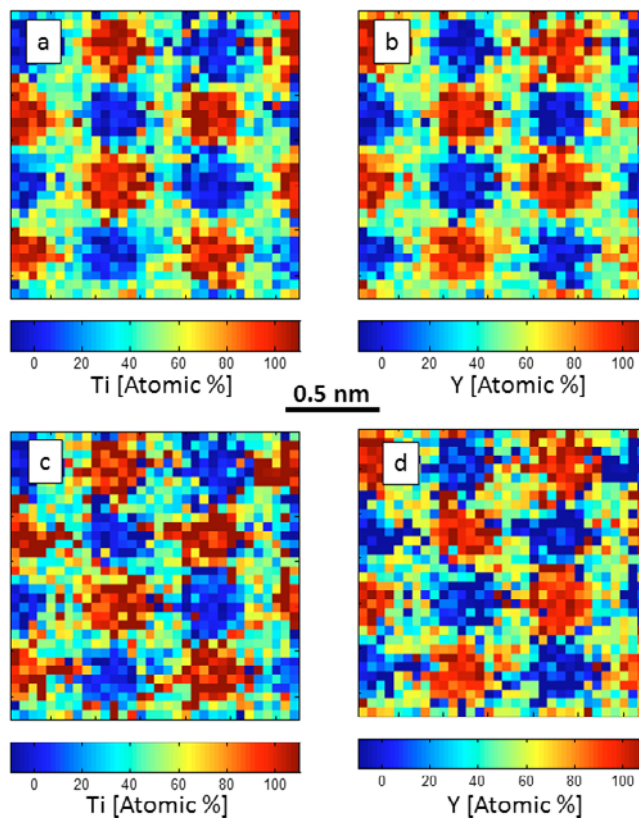**Supplementary Figure 3**. Comparison of post-MSA segmentation of the full spectral image quantifying only the Ti-K and Y-L (**a, b**) and Ti-K and Y-K (**c, d**). Note that the two analyses look identical owing to the MSA, which inextricably links the co-varying signals of Y-L and Y-K.

Supplementary Figure 4. **a:** MSA analysis from the pre-MSA partitioned spectral image using only the Ti-K and Y-L. **b:** MSA analysis from the pre-MSA partitioned spectral image using only the Ti-K and Y-K.

Supplementary Figure 5. **a, b:** Concentration images from the pre-MSA partitioned and subsequent quantification using only the Ti-K and Y-L. **c, d:** Concentration images from the pre-MSA partitioned and subsequent quantification using only the Ti-K and Y-K.