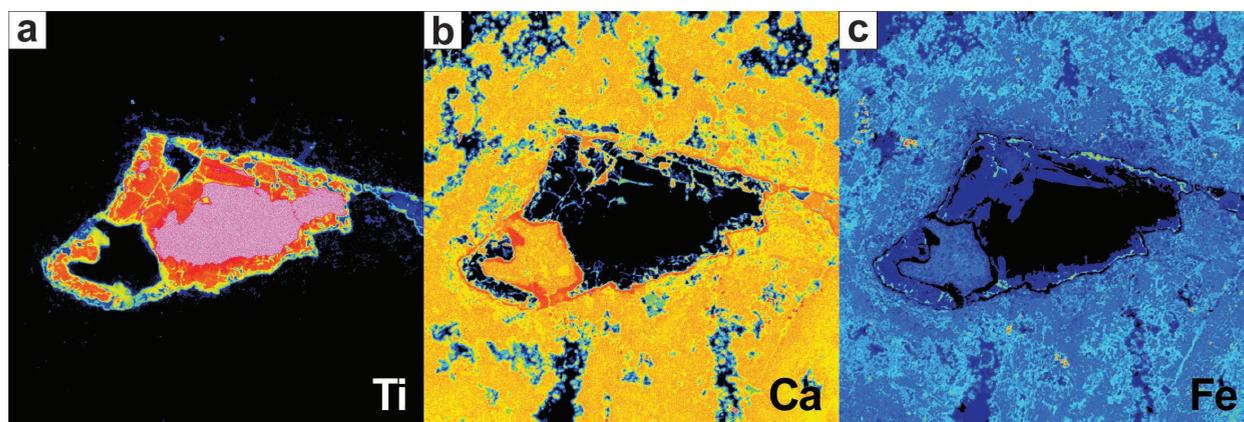


SUPPLEMENTAL FIGURE S1. Thick section of the pyroxenite showing the location of rutile with nixonite under a) transmitted and b) oblique light; c) and d) are close ups of the rutile grain under incident light.



SUPPLEMENTAL FIGURE S2. False-color (16 shades) X-ray intensity maps. **a)** Ti map showing rutile host and rare Ti minerals surrounding it; **b)** Ca map highlighting perovskite and the alteration rim on rutile; **c)** Fe map highlighting ilmenite and the alteration rim on rutile.