

Supplemental Document

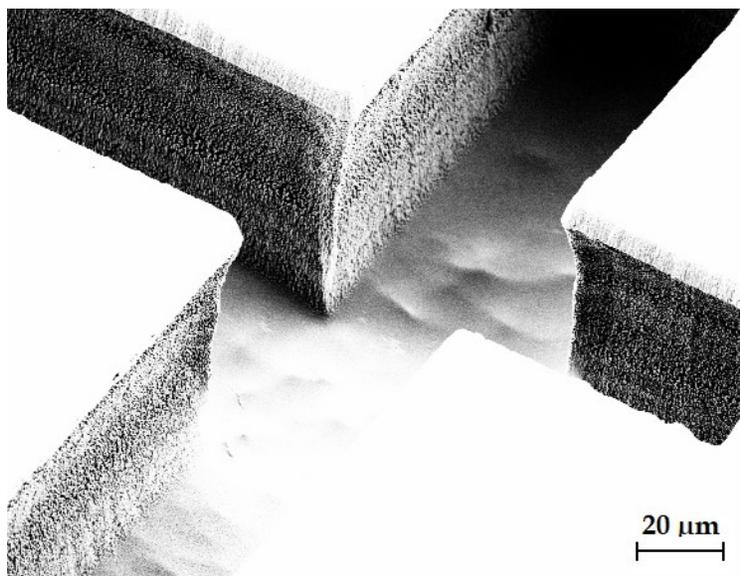


Figure 1: Scanning electron microscopy image of 100 μm wide trenches with a depth of 90 μm etched in an $\text{SF}_6/\text{O}_2/\text{Ar}$ plasma.

The SF_6 flow rate, the O_2 flow rate, the Ar flow rate, the pressure, the coil power and the RF bias power were kept constant at 60 sccm, 40 sccm, 20 sccm, 10 mTorr, 1200W and 250 W respectively.

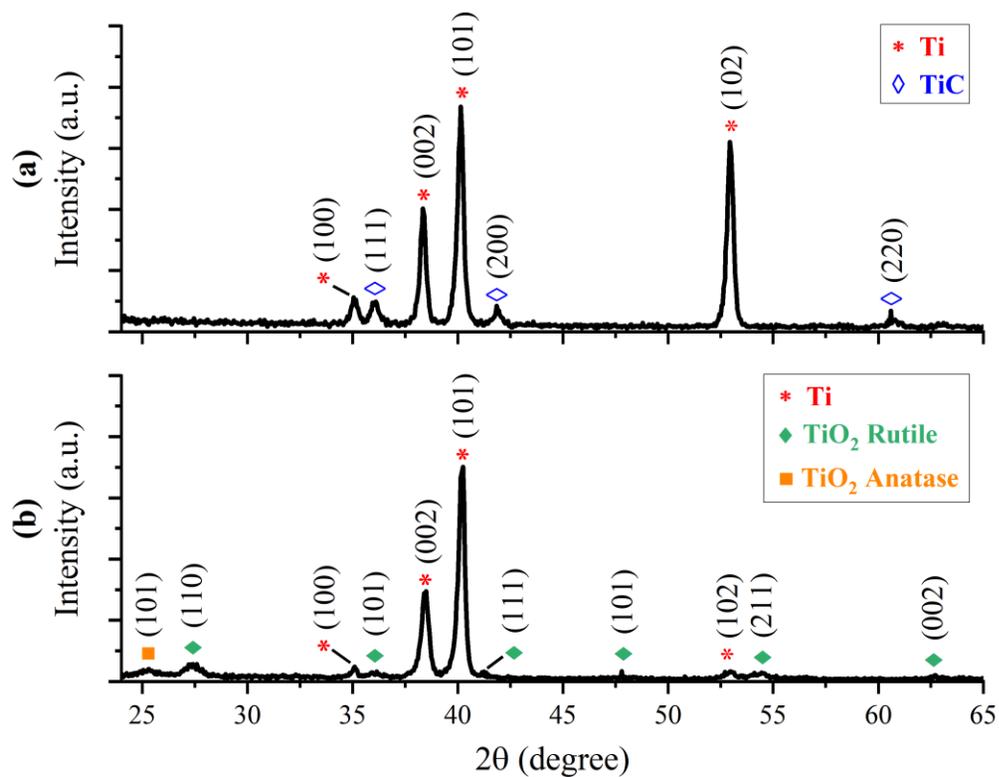
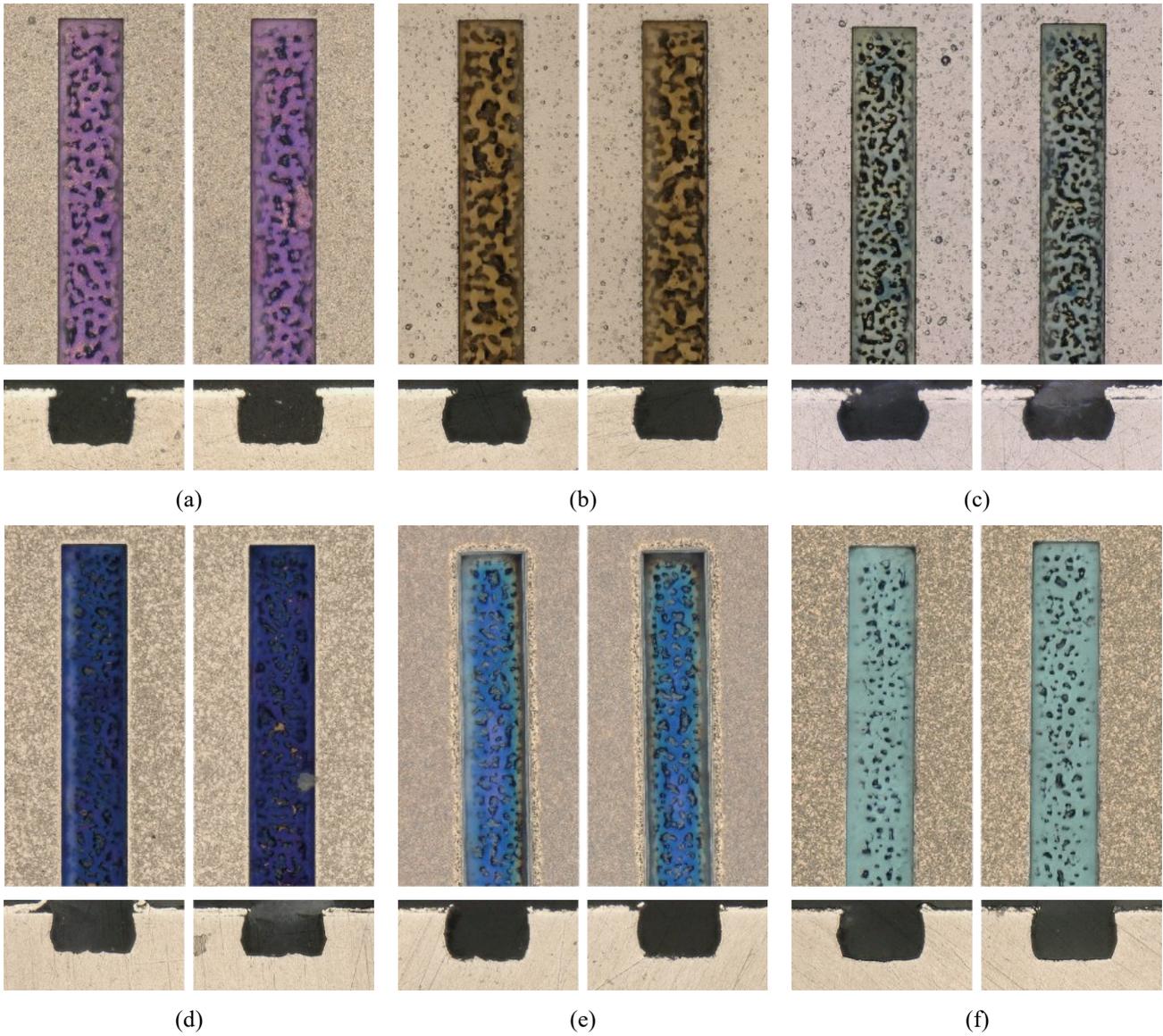


Figure 2: Grazing incidence X-ray diffraction (GiXRD) patterns of bulk titanium samples (a) before and (b) after etching, along the etch front (not the walls).



100 μm

Figure 3: Top view images of 100 μm wide trenches and corresponding cross-sections etched under various O_2 -based etching environments: (a) $\text{O}_2:\text{Ar} = 2:1$ and 250W self-bias power, (b) $\text{O}_2:\text{Ar} = 2:1$ and 200W self-bias power, (c) $\text{O}_2:\text{Ar} = 4:1$ and 200W self-bias power, (d) $\text{O}_2:\text{Ar} = 1:1$ and 175W self-bias power, (e) $\text{O}_2:\text{Ar} = 1:1$ and 200W self-bias power and (f) $\text{O}_2:\text{Ar} = 1:1$ and 250W self-bias power.

The SF_6 gas flow rate, the O_2 flow, the pressure, the coil power and etch duration were kept constant at 60 sccm, 40 sccm, 10 mTorr, 1200W and 30 min, respectively.