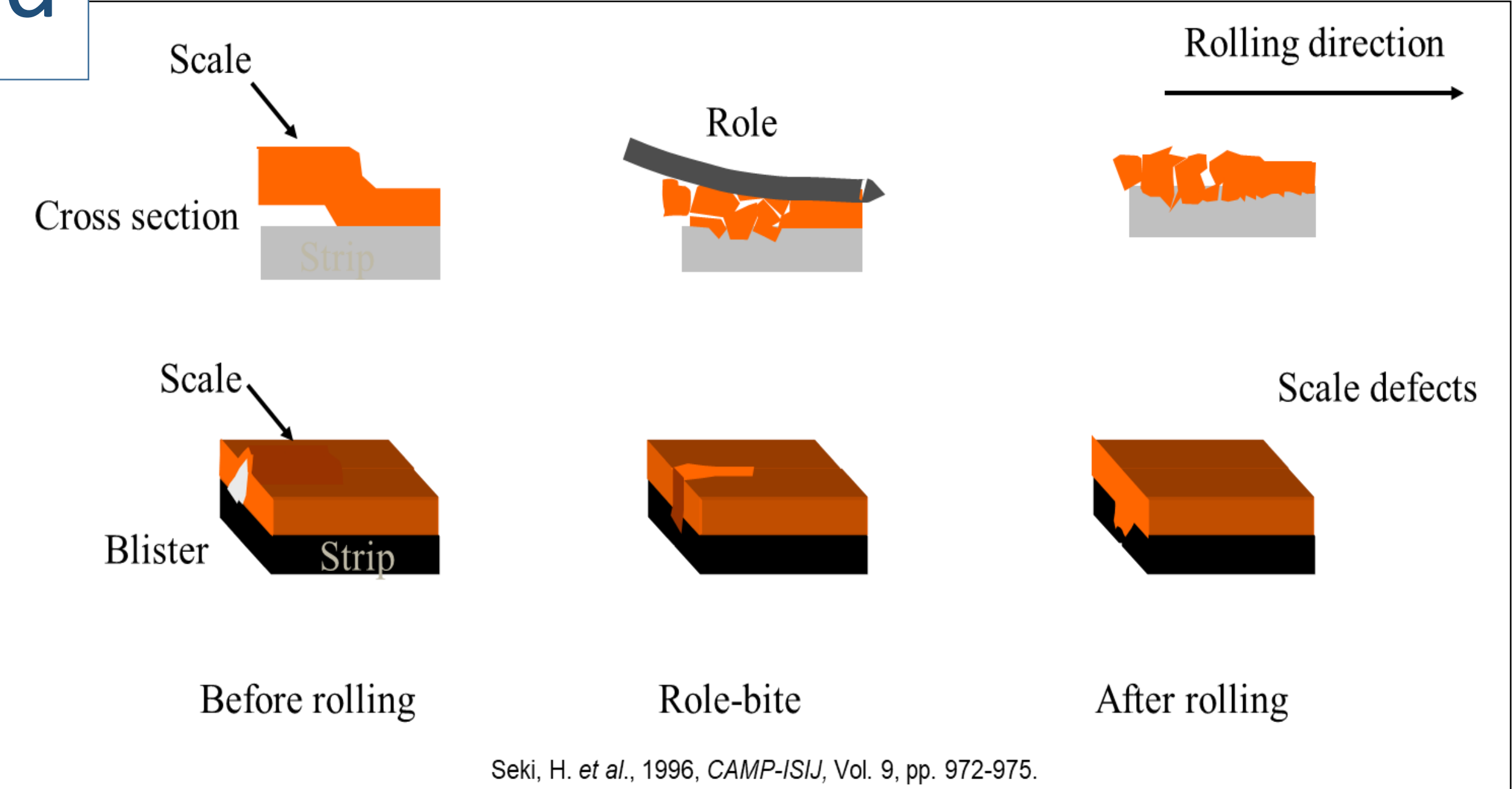


# Blister Formation in Electrical Steels During Hot Rolling

## Project Background

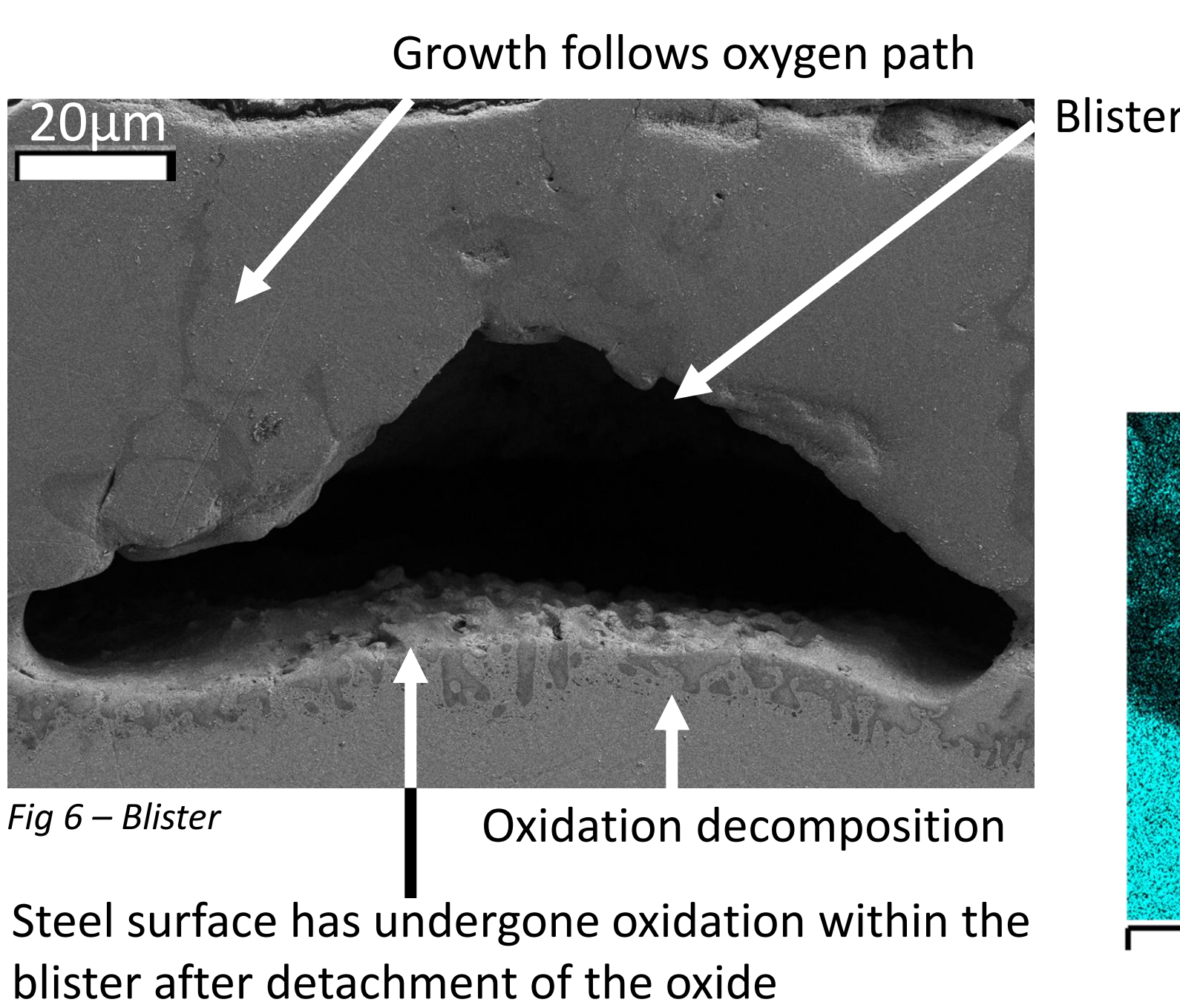
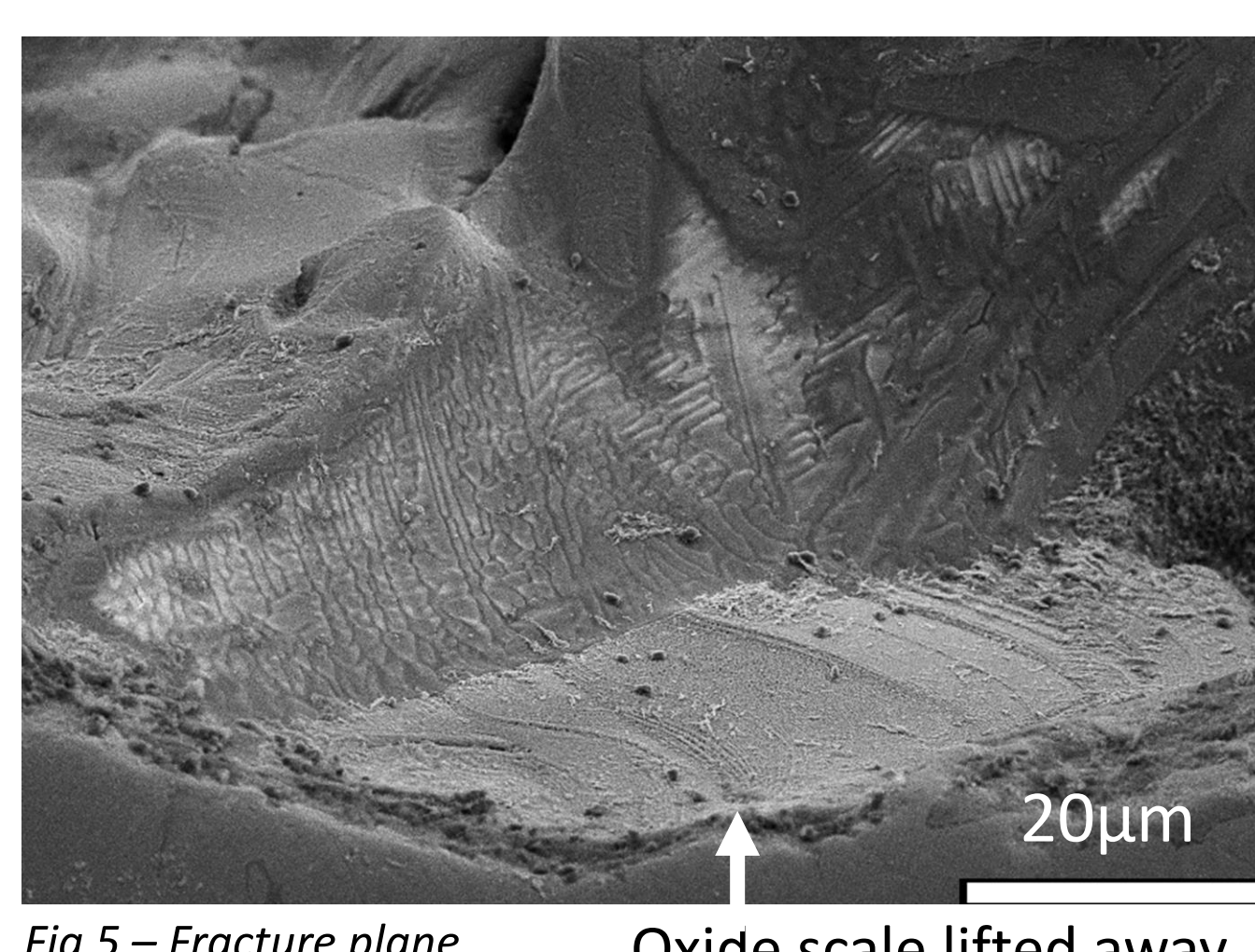
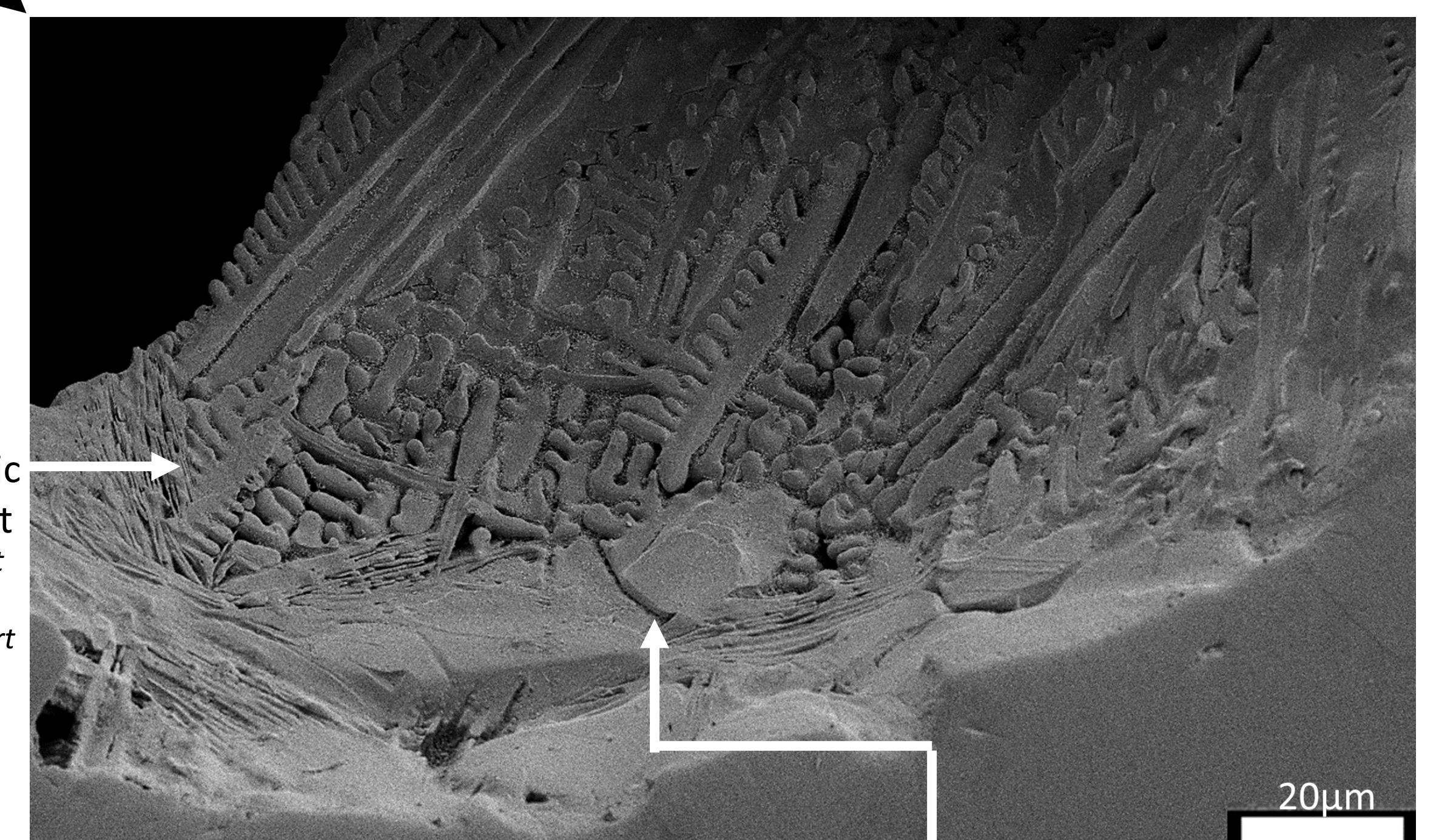
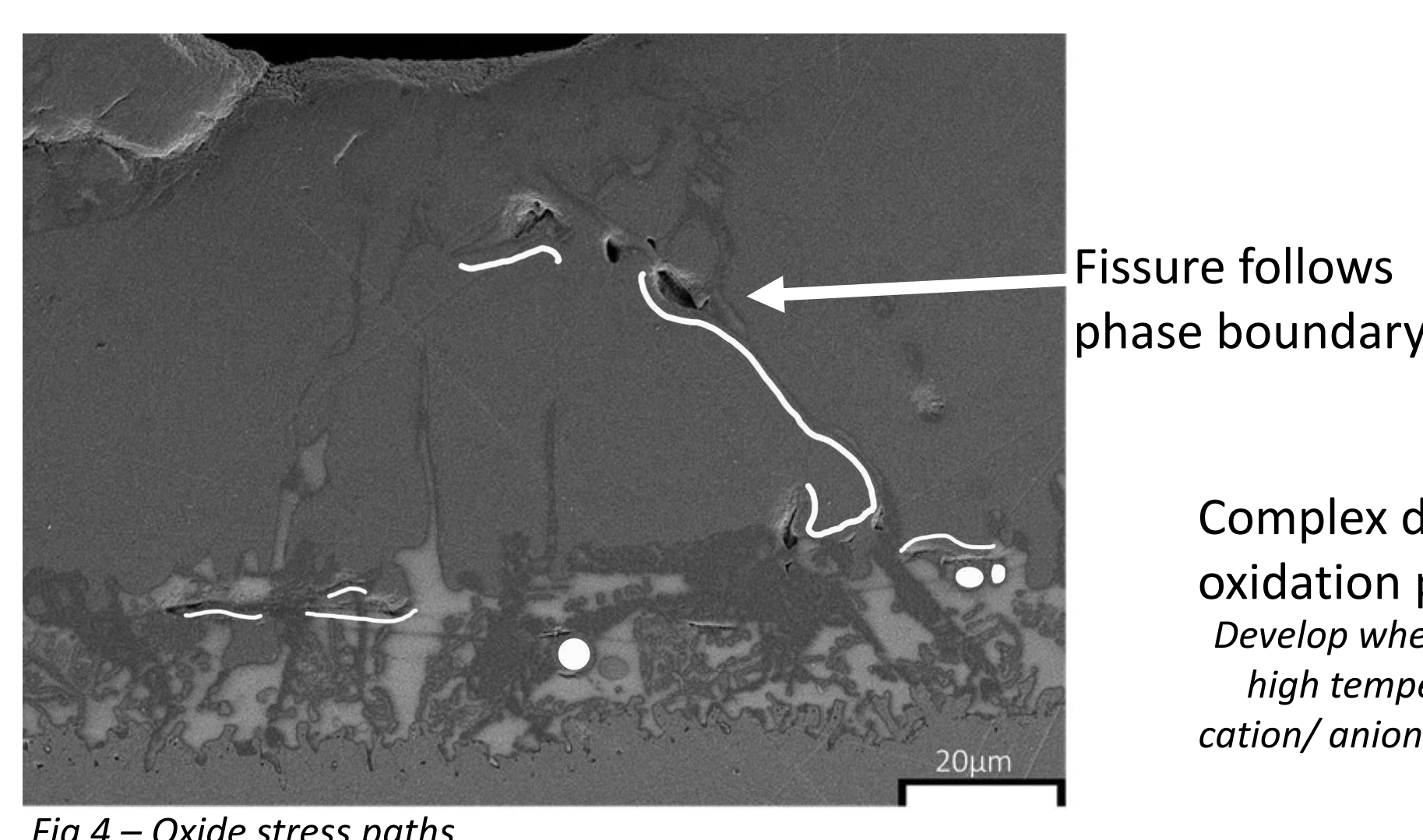
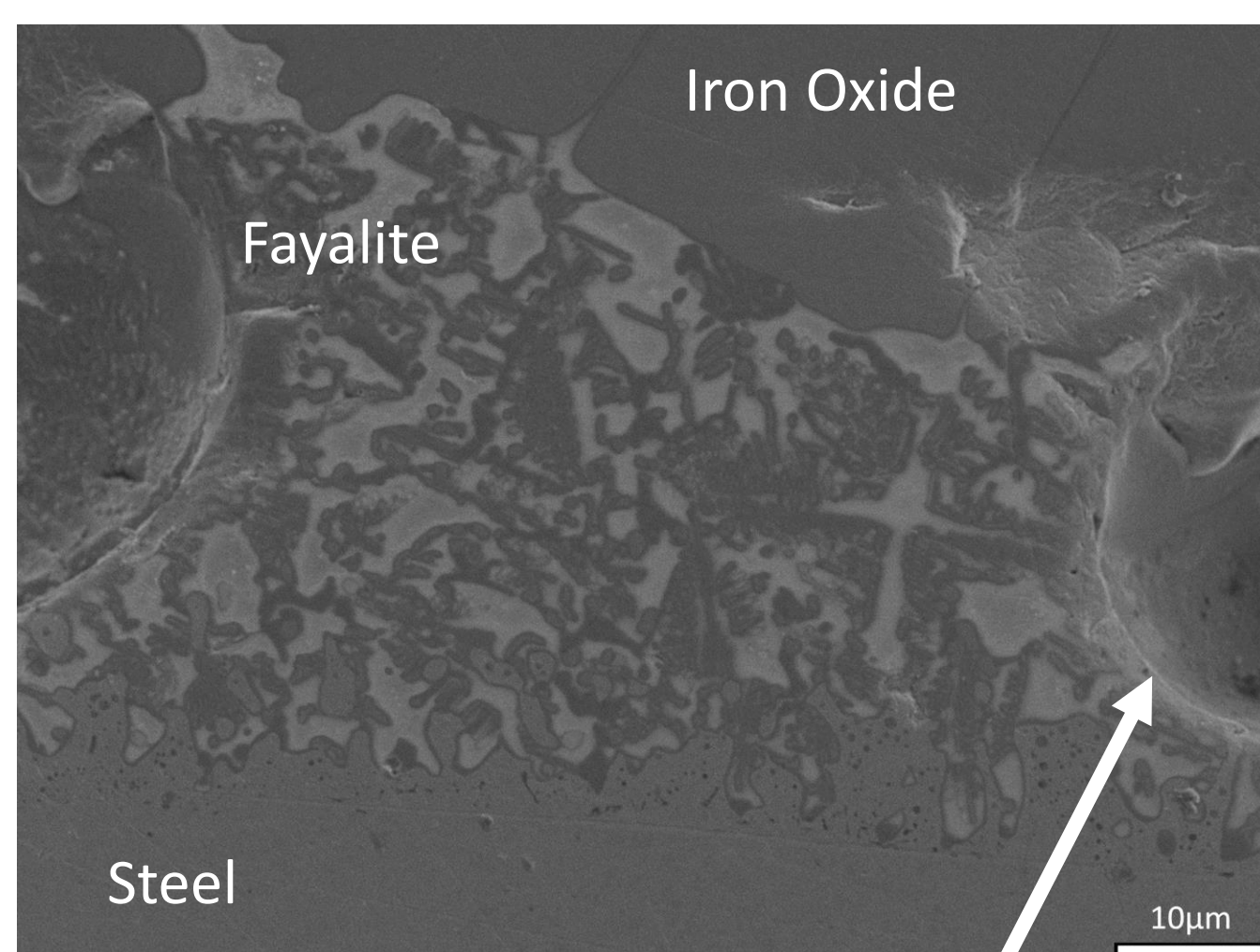
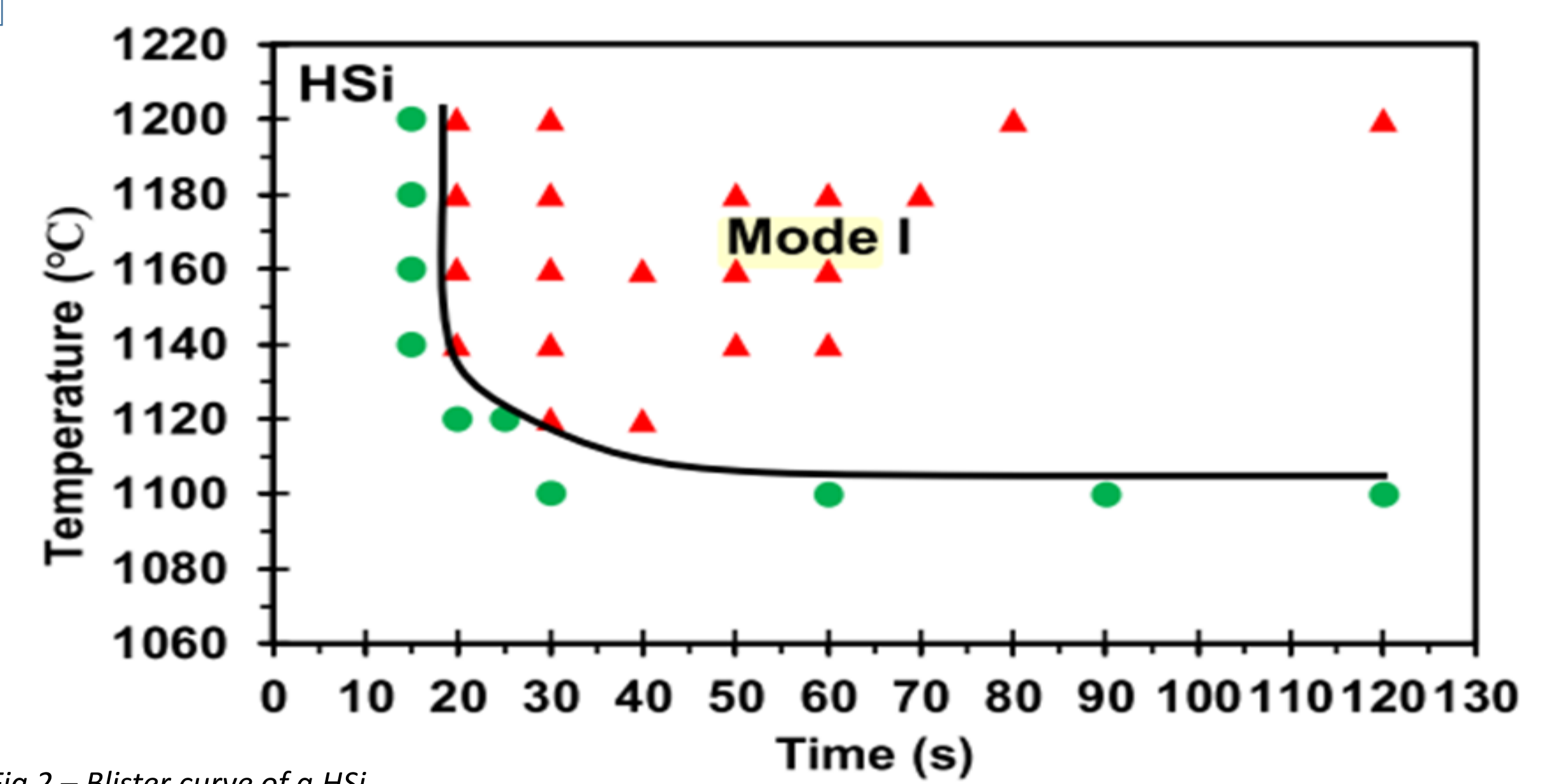
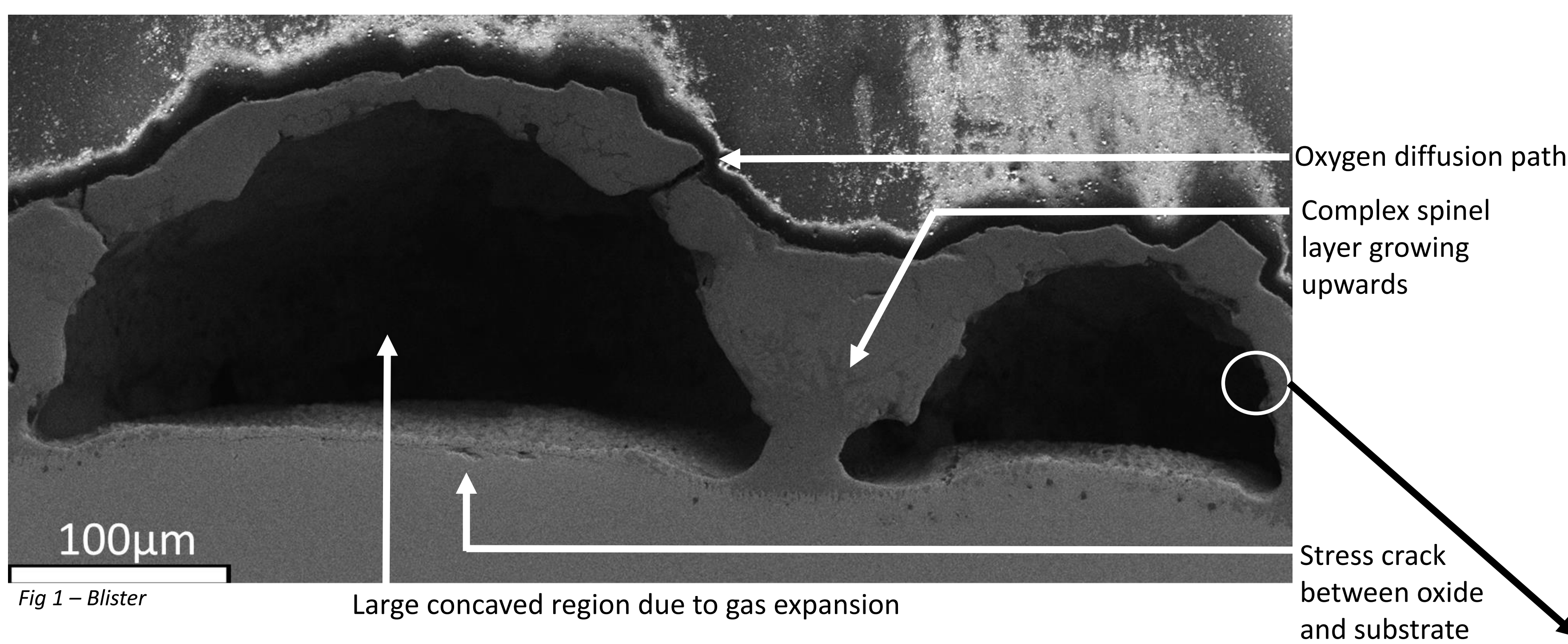
- Blistering occurs when oxide scale is swollen during oxidation; generating a critical stress and gas release at the scale/ steel interface.
- Blistered scale causes surface defect problems when it is rolled, becoming embedded into the steel.
- It is important to understand the mechanism of blistering and control the blister formation in order to prevent surface defects.
- Severe blistering has been found to occur in temperatures between 950 and 1000°C.

Nucleation and growth modes were investigated in order to understand the mechanism of blister formation.

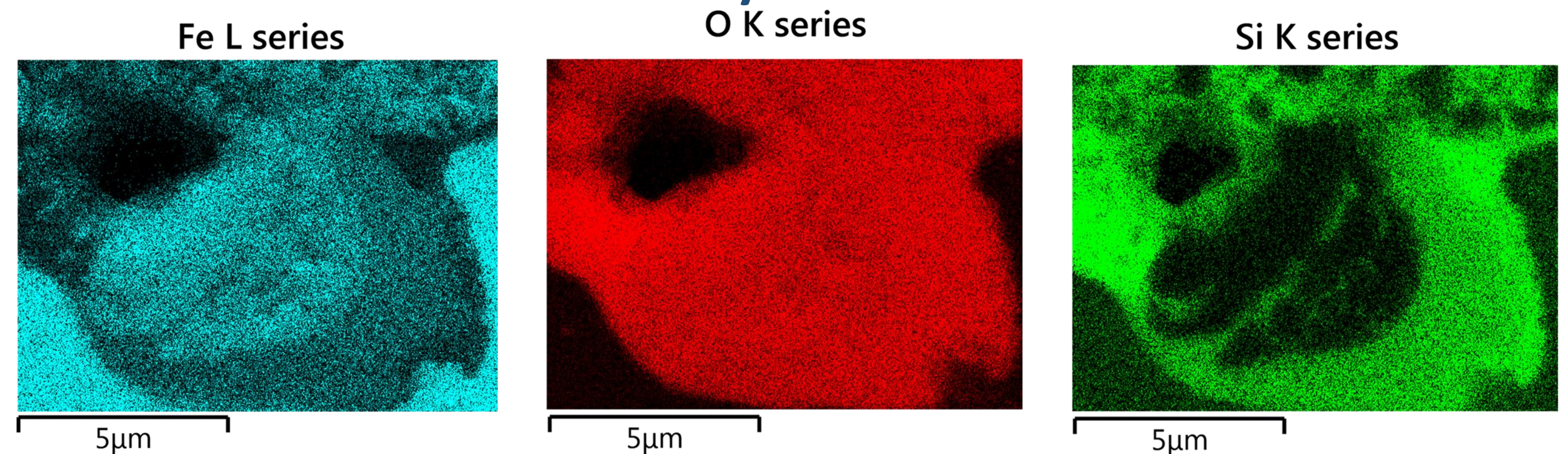


## Investigation

FEG-SEM images of a 2.4wt% Si steel oxidised for one hour at 950°C

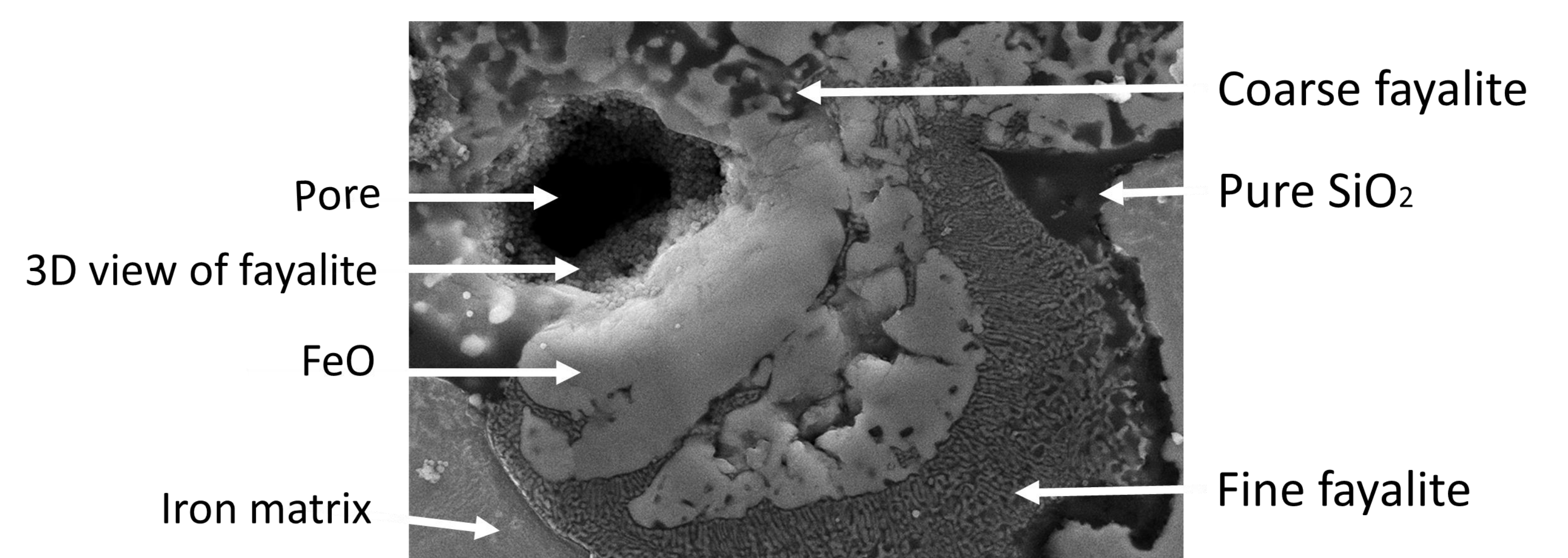


## Fayalite



## Conclusions

- Scale morphology will influence surface strip quality, work roll wear and removability of the scale.
- The SEM and EDS oxide scale characterisation show a complex spinel morphology of fayalite penetrating into the underlying steel matrix.
- The penetrating fayalite oxide makes scale removal highly difficult
- Oxidation can be seen within the blisters



1. Kingdom U, Testu O. BLISTERING FORMATION IN THREE STEELS WITH DIFFERENT CARBON AND ALLOY ADDITIONS.