

Figure 28. Fractograph from location #6 shows failure due to dimpled (overload) fracture; X202.

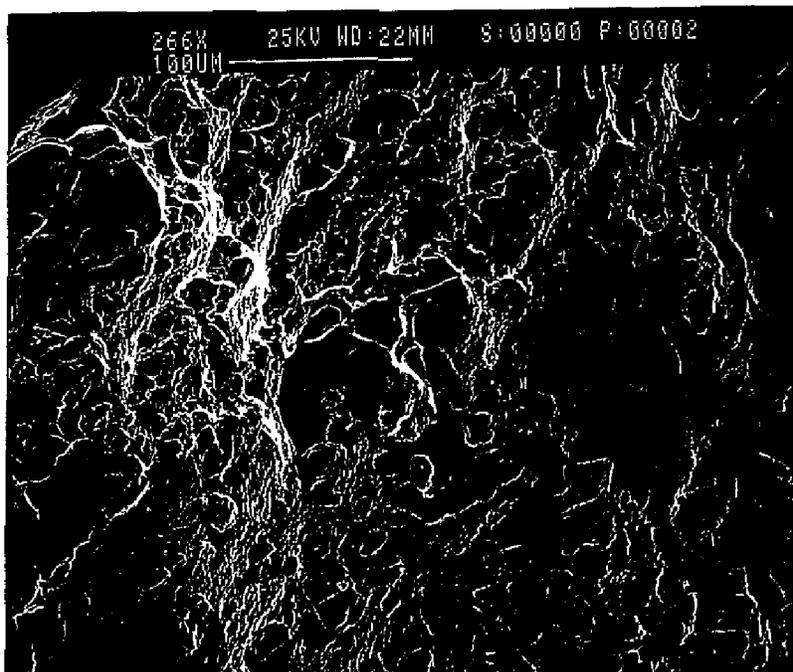


Figure 29. Fractograph from location #7 showing similar features as in Figure 28; X266.

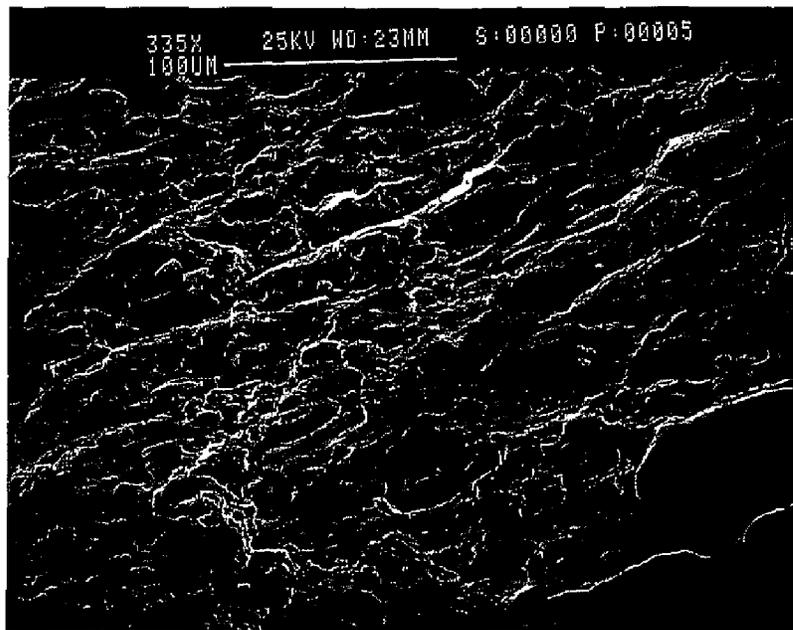


Figure 30. Fractograph from location #8 showing failure due to overload. Some indications of grain boundary failure are evident; X335.

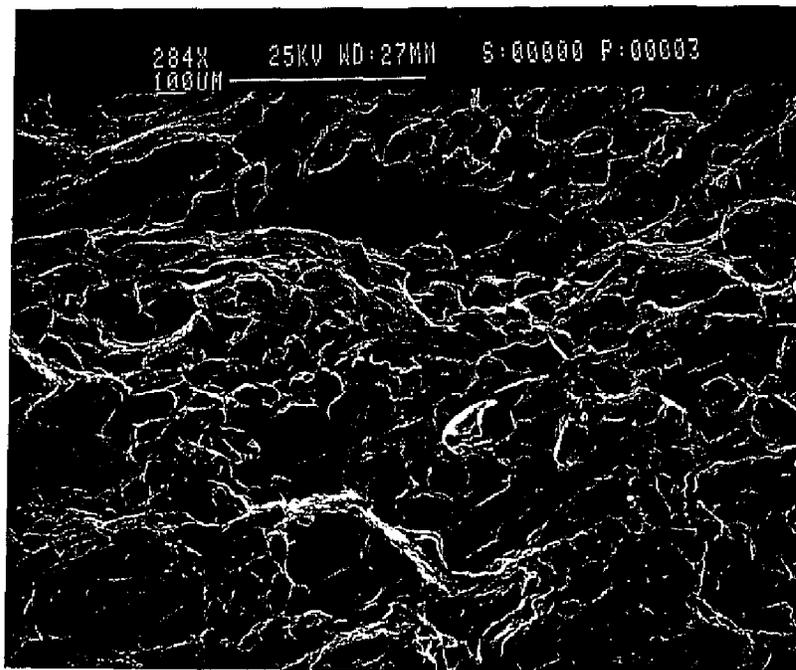


Figure 31. Fractograph from location #9 exhibits similar features as in Figure 30 showing a mixed mode of failure; X284.

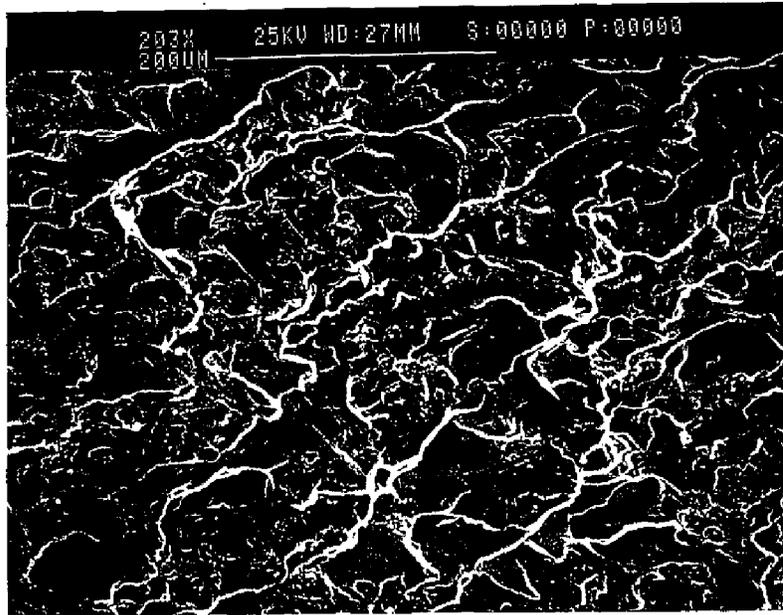
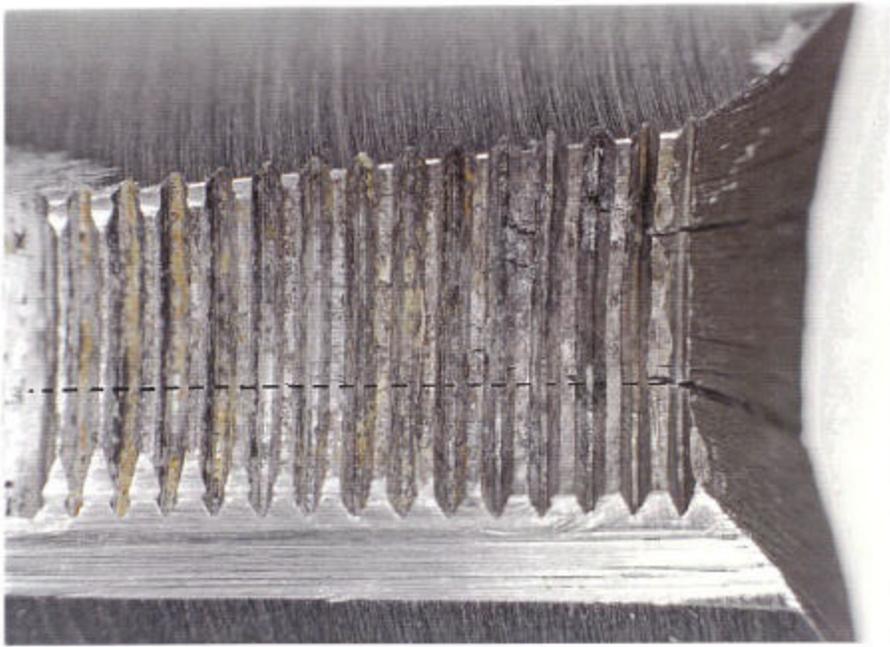
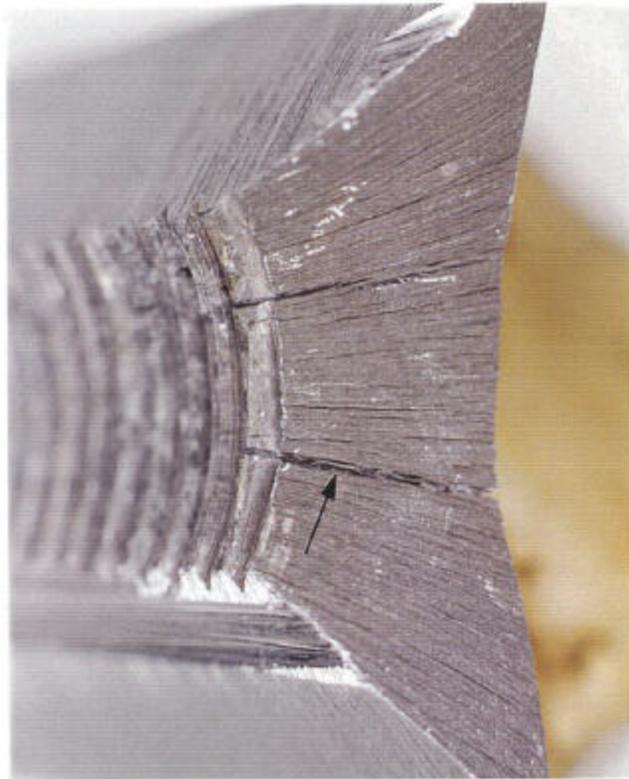


Figure 32.

Fractograph from location #10 shows failure due shear overload; X203.



a.



b.

Figure 33.

Photographs of an area from the neck region showing the threaded zone (a) and the adjacent internal surface (b). Note the crack-like features in both photos. The crack indicated by arrow was opened for detailed examination.

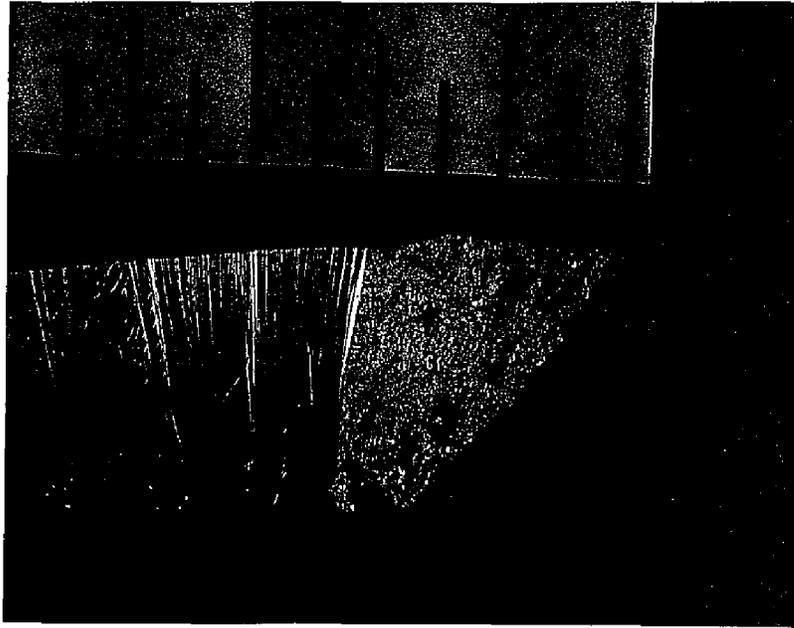


Figure 34. An enlarged view of the lab-created fracture surface. Locations indicated by arrowed numbers were examined at higher magnifications; X6.

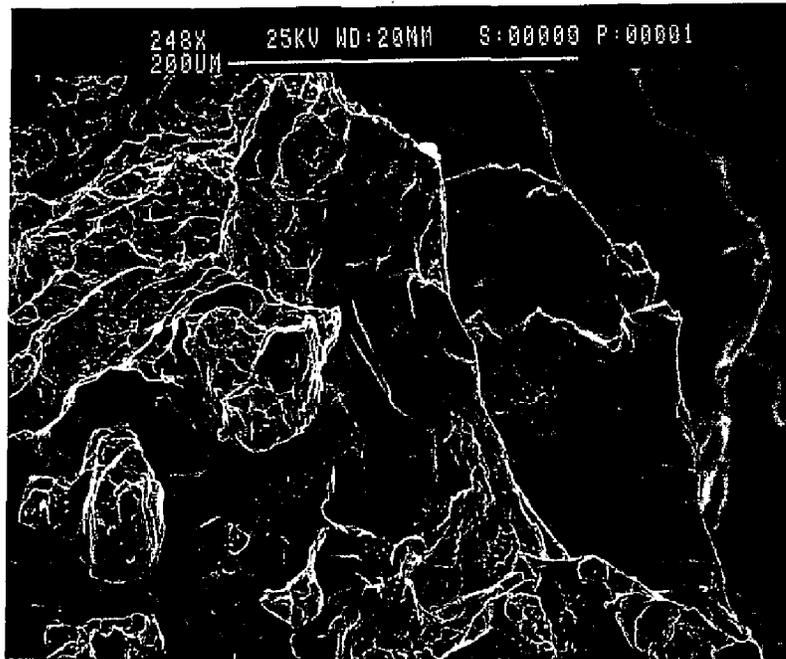


Figure 35. Fractograph, from location #1 in Figure 34, exhibits featureless facets as indicated in Figures 24-27. It also shows some area having dimpled rupture; X248.

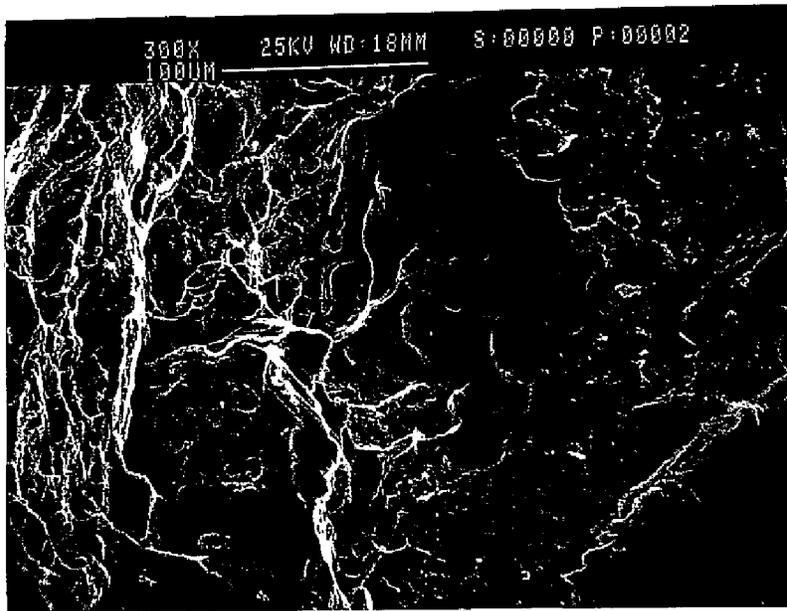


Figure 36. It shows similar features as in Figure 35; X248.

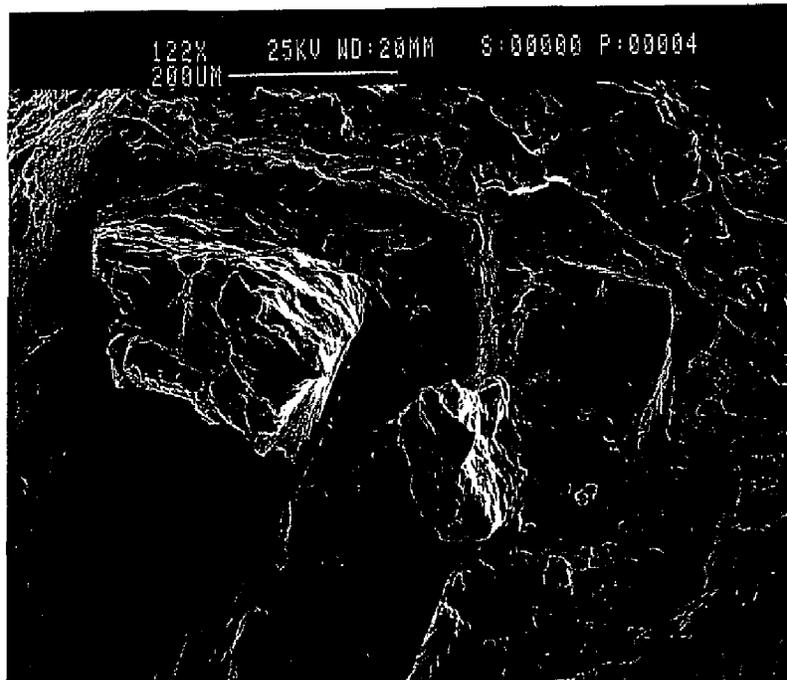


Figure 37. Fractograph exhibits featureless facets and some dimpled rupture. The particle-like object (arrow) appears to be a chunk of dross. X122.

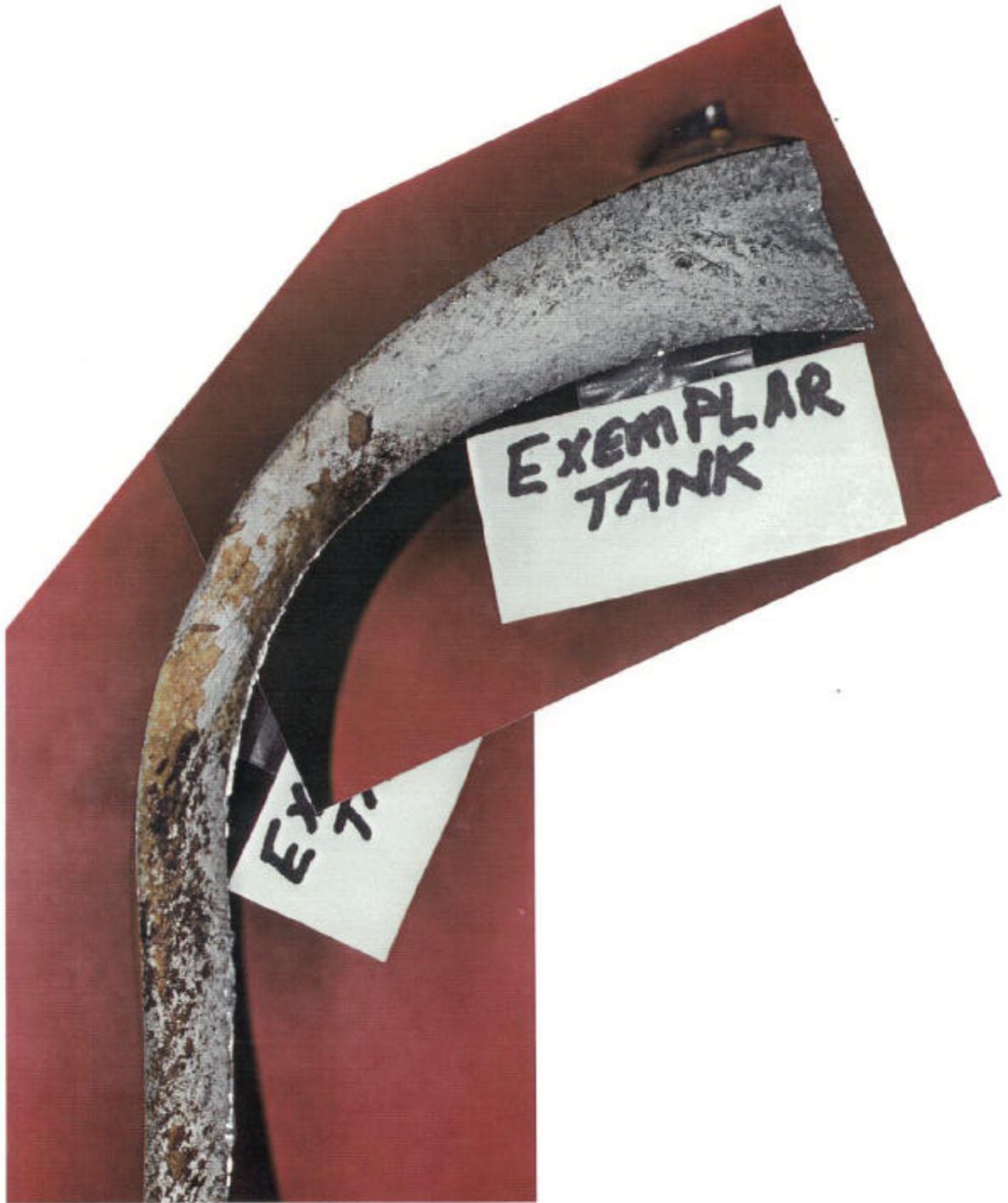


Figure 38. As-received view of the exemplar fracture surface.

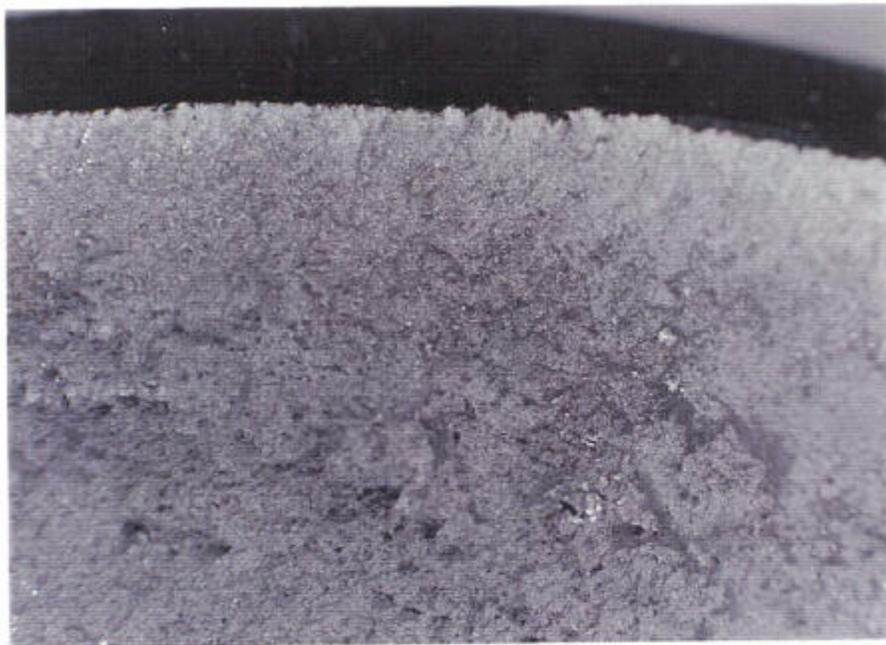
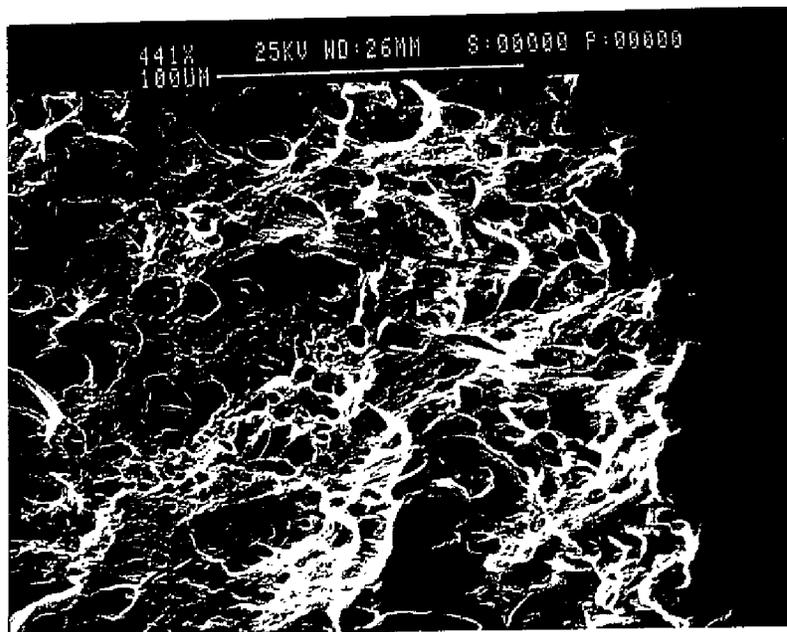
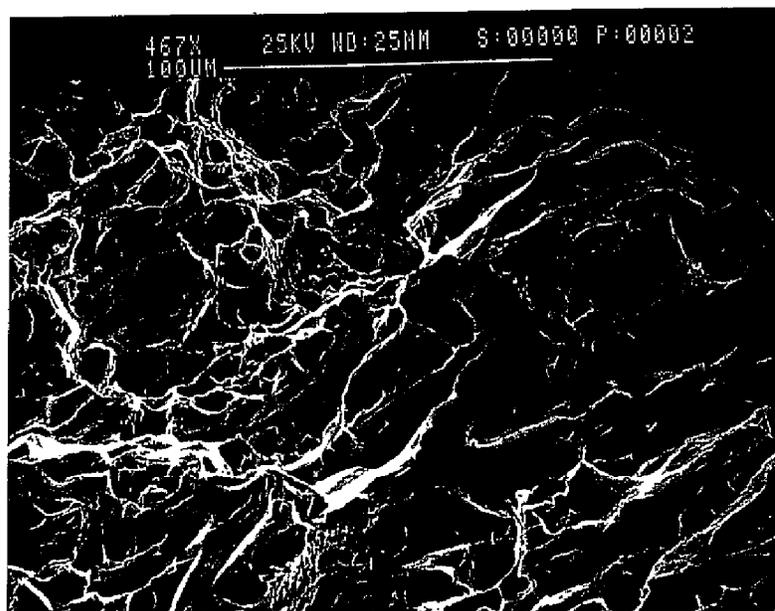


Figure 39. Enlarged views of the fracture surface does not show the presence of dross and voids. Compare this Figure to Figure 21.



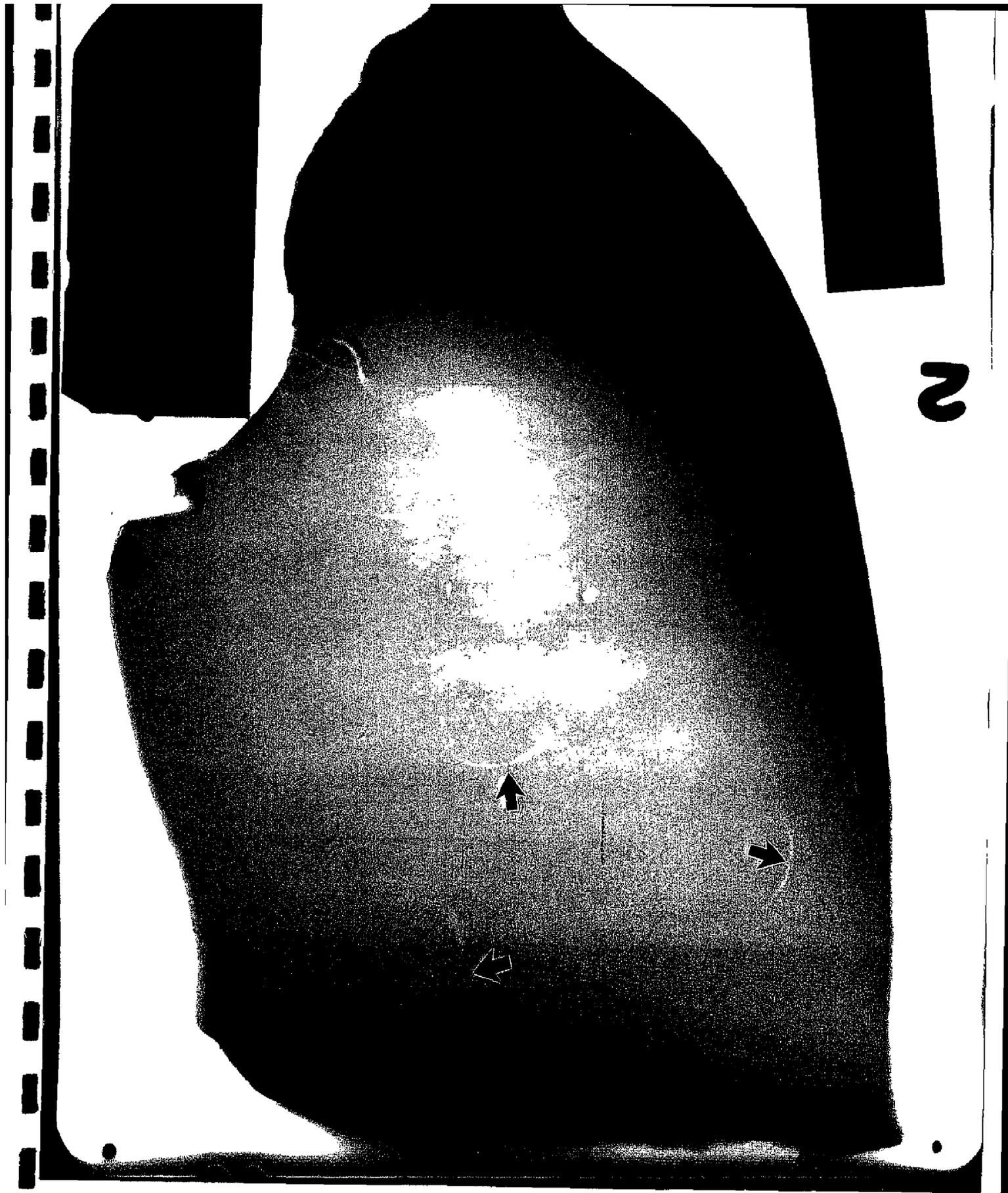
a;X441



b;X467

Figure 40.

SEM fractograph shows initiation of the failure occurring by overload tearing near the neck on the inside surface (a); a mixed mode failure consisting of dimpled rupture and intergranular fracture was observed in the region remote from the initiation zone (b). Compare these micrographs to Figures 23 and 30.



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Figure 41. Positive print of an X-ray radiograph of fracture piece (4) showing several indications (arrows) not attributable to surface damage.

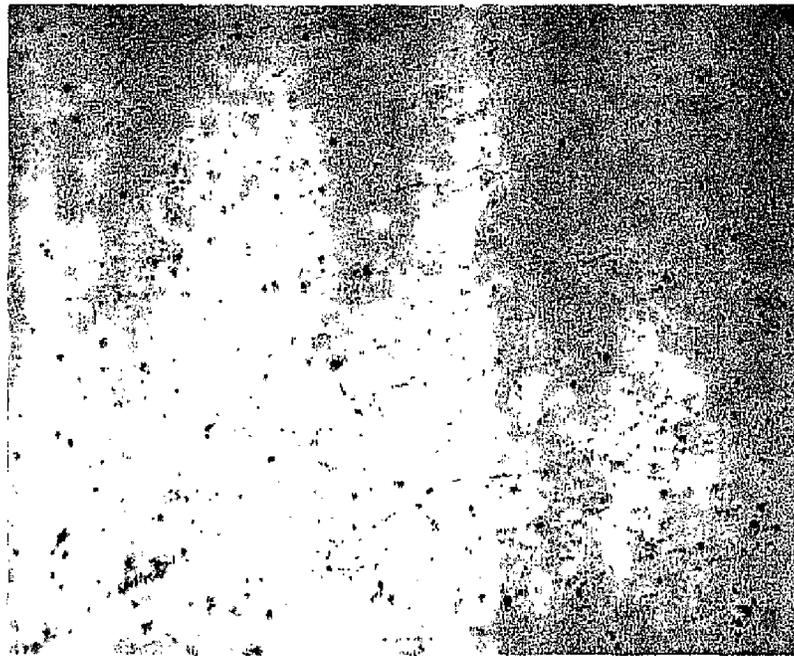
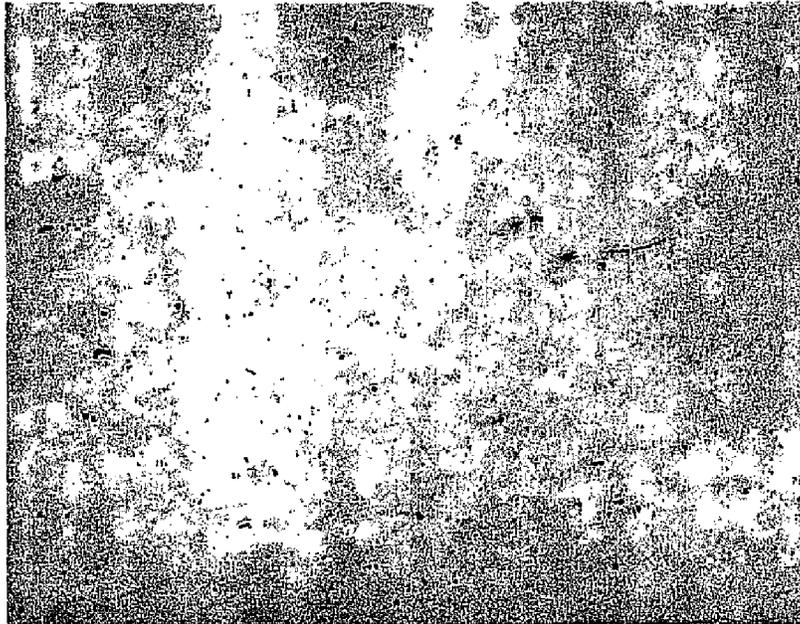


Figure 42.

As-polished transverse sections, from an X-ray radiograph indication in fracture piece (4) (top) and from exemplar fracture sample (bottom) showing relatively higher and more elongated inclusion content in the radiographic indication, X50.