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Revealing the microstructure of Super Alloys using Lucas' Reagent

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Alloys possessing the properties of high strength along with heat and corrosion resistance are called super alloys. These alloys are based on cobalt, nickel or iron and nickel and by their very nature of being corrosion resistance are difficult to etch. The degree of working or the heat treatment of super alloys can alter their response to most etchants making it difficult to view and interpret microstructures of the same alloy in different conditions. The more common etchants often do not clearly reveal all of the grain boundaries or bring out the texture and fine detail in cast alloys. An etchant was developed 18 years ago that overcomes most of these obstacles.

This presentation discusses specimen preparation of super alloys and compares microstructures revealed through the use of a number of etchant to Lucas' Reagent.

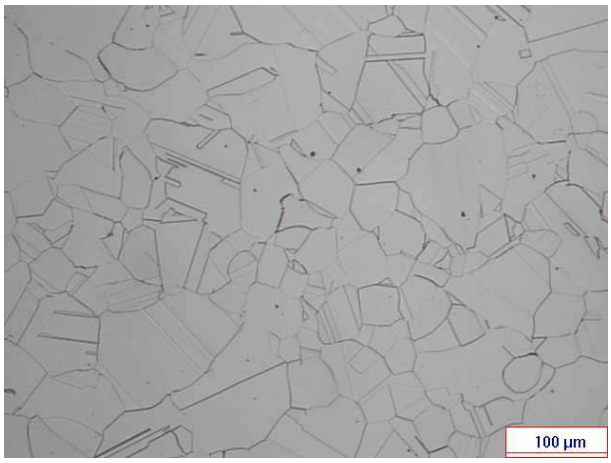

Fig1. C276 deformed at 1200 ˚C, strain rate 0.5

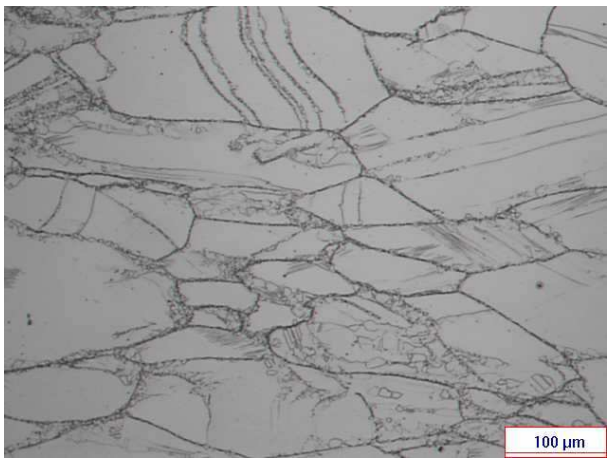

Fig 2. C276 deformed at 950 ˚C, strain rate 1.0

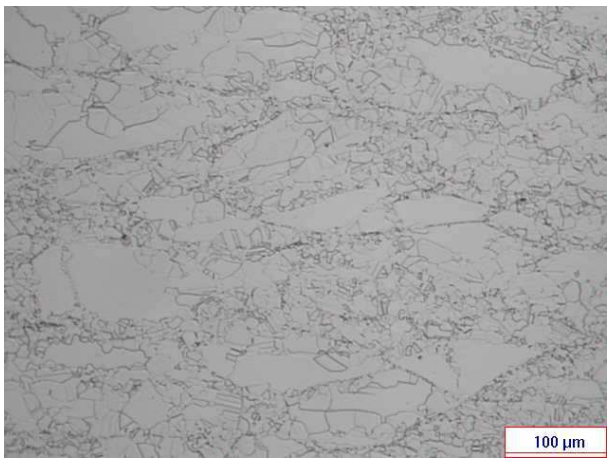

Fig 3. C276 deformed at 1000 ˚C strain rate 20

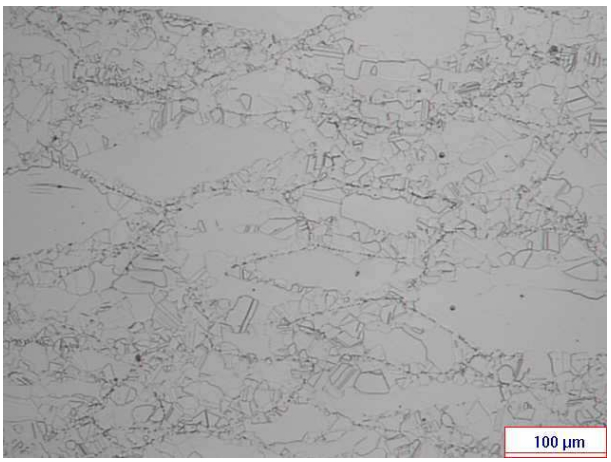

Fig 4. C276 deformed at 1100 ˚C strain rate 20

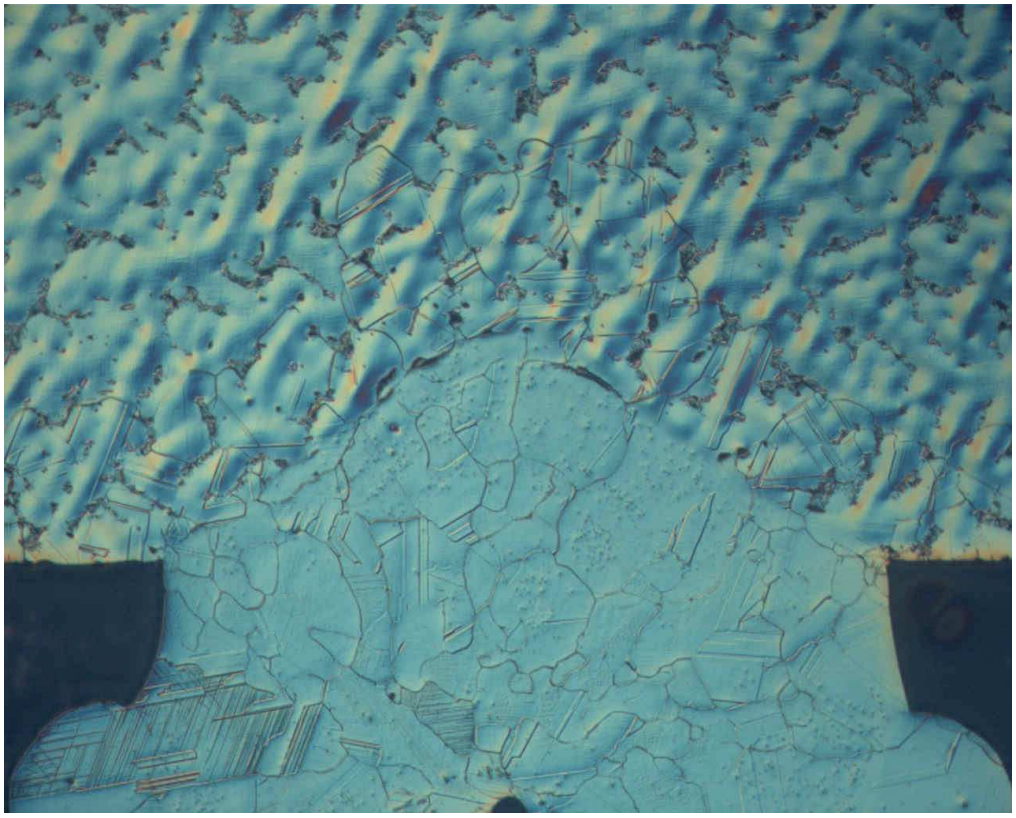

Fig 5. CoCrMo femoral knee replacement where the wire mesh is welded to the cast base 200X

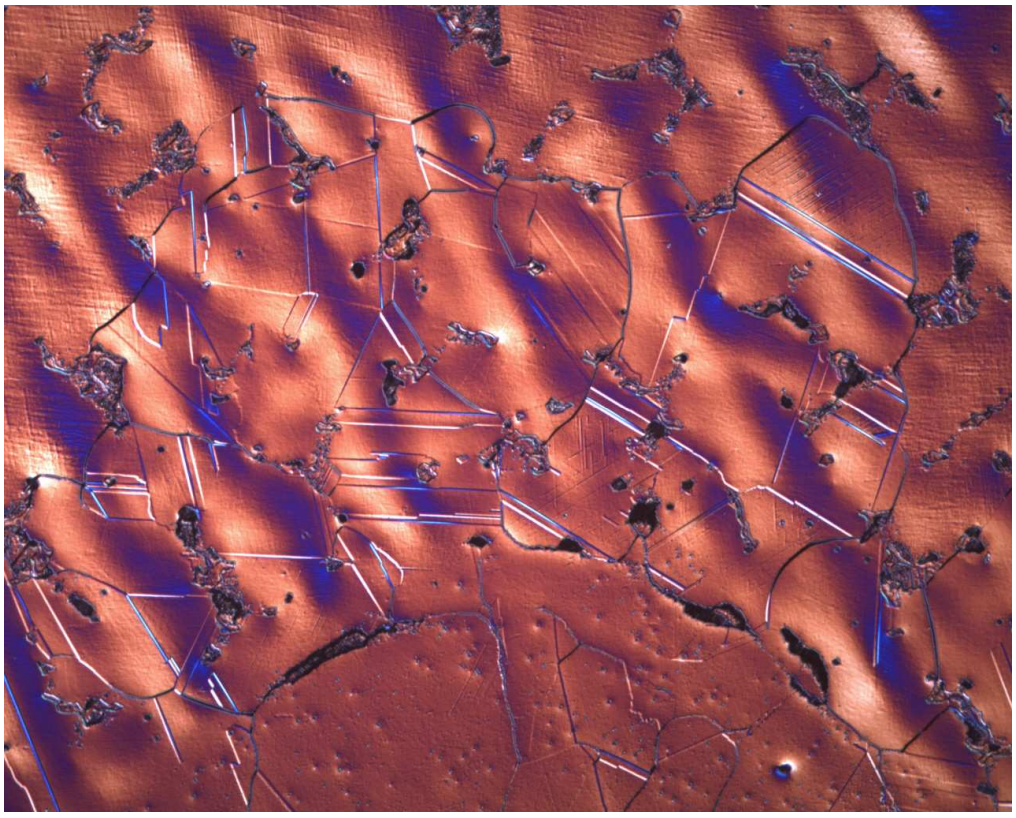

Fig 5. CoCrMo femoral knee replacement where the wire mesh is welded to the cast base 500X

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