Understanding the role of defects on fatigue : interaction between defect and microstructure

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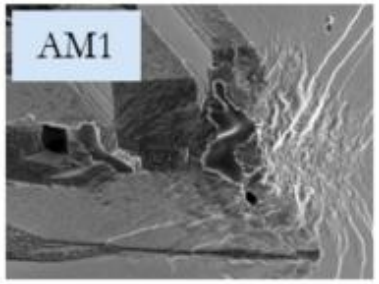
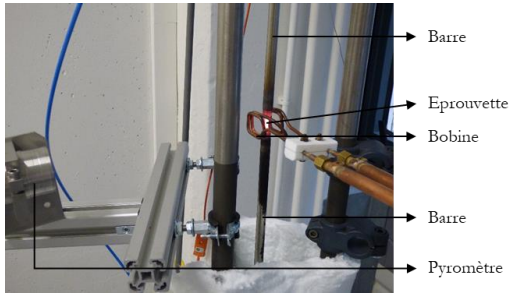
Role of the microstructure on fatigue limit in the presence of defects (Al-based alloys, Inconel (718, 625, ... alloys)
Understanding of the frequency effect and the role of defects at very high temperature of nickel-based single crystals (SX)
Identification of damage mechanisms in AM alloys

Even in the presence of defects, the **microstructure plays a significant role** in the fatigue limit (cast Al, Inconel alloys, AlSi SLM)
In pure iron, the size of the **critical defect** which influences the fatigue limit **is close to the grain size**
By using the DSG criterion and a porosity growth model (casting simulation), it is possible to directly calculate the fatigue strength of a structure from the simulation of the process (**Through Process Modelling** chain)
Mapping of **crack initiation mechanisms** in Inconel 718 as a function of grain size, carbides and precipitation structure
Fatigue experience at **20 kHz** and high temperature (from 700°C to **1200** ° C)
Fundamental crack initiation mechanisms around the pores according to the load ratio: analysis of the contributions of fatigue and creep
Fatigue criterion on single crystals integrating time, temperature and defect size
Process-induced surface recrystallization: **analysis of the mechanisms** and link with the coating deposition process of Ni-based SX alloys
Damage mechanism in a single crystal obtained by the additive route (**EBM**)

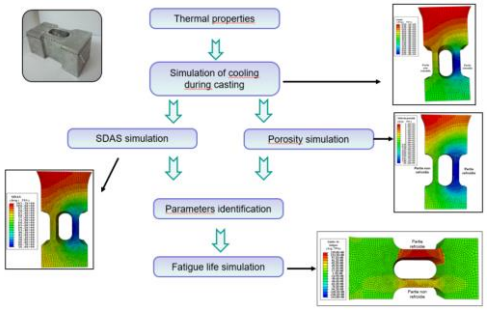
Mechanisms / Defect



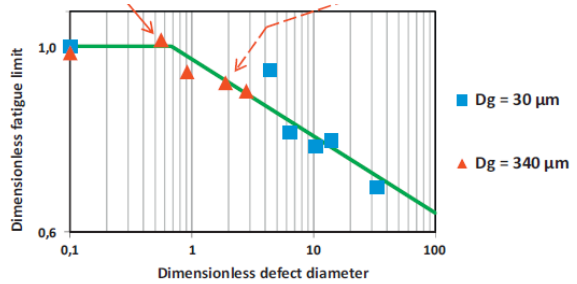
20 kHz at 1000°C



TPM cast Al



Dimensionless Kitagawa



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