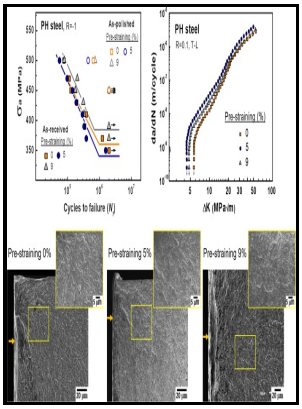
High cycle fatigue crack propagaton in steels.

University of Birmingham - Understanding main factors controlling high cycle fatigue crack initiation and propagation of high strength maraging stainless steels with Ti addition



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Mechanism of fatigue crack initiation and propagation in the very high cycle fatigue regime of high

Various researchers indicate that fatigue failure inside the volume is comparable to failure in a vacuum environment Billaudeau et al. From the fracture mechanical point of view the vacuum tests with artificial defects correlate quite well to failure at subsurface inclusions. In previous work Spriestersbach et al.

Effect of inclusion size on the high cycle fatigue strength and failure mode of a high V alloyed powder metallurgy tool steel

Based on the modified static fracture model, the effective stress intensity factor range ΔK eff, which is defined as the difference between ΔK and the fatigue crack propagation threshold value Δ th, is taken as the governing parameter for fatigue crack propagation. The model proposed by Grad et al.

On the fatigue crack propagation mechanism of a TiB2

The fracture surface is very smooth without any crack path deflection. International Journal of Fatigue, 28, 1471-1478. Gunnarsson, Inclusions, stress concentrations and surface condition in bending fatigue of an H13 tool steel, Steel Res.

High

The coalescence of micro-debondings at the interface of the fine granular layer and the coarse matrix leads finally to initiation of a macroscopic crack.

Effect of Pre

It was shown that brittle inclusions with large sizes above 30 μm prompted the occurrence of subsurface crack initiation and the reduction in fatigue strength. This work was also supported by the Engineering Research Center ERC Program through the National Research Foundation of Korea NRF funded by the Ministry of Education, Science and Technology 2018R1A5A6075959.

Mechanism of fatigue crack initiation and propagation in the very high cycle fatigue regime of high

Thus, the size of the FGA is the border of this rough area as shown by the white dotted line in Fig. Within this work the optimized testing method from Spriestersbach et al. ASTM Standard E647 Standard test method for measurement of fatigue crack growth rates, Annual Book of ASTM Standards, 03.

Mechanism of fatigue crack initiation and propagation in the very high cycle fatigue regime of high

The resulting martensitic microstructure in Fig. Danninger, Fractographic evaluation of gigacycle fatigue crack nucleation and propagation of a high Cr alloyed cold work tool steel, Int. The artificial defect in this image is placed in the left and the fracture surface is located at the top, as in Fig.

Fatigue crack propagation in steels

In the following the microstructure of the FGA like structure in the vicinity of the defects will be visualized in detail by TEM in combination with local SAD measurement to check whether fatigue crack initiation at artificial defects for VHCF is comparable to initiation at inclusions which was observed in detail in our prior work by Grad et al.

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