

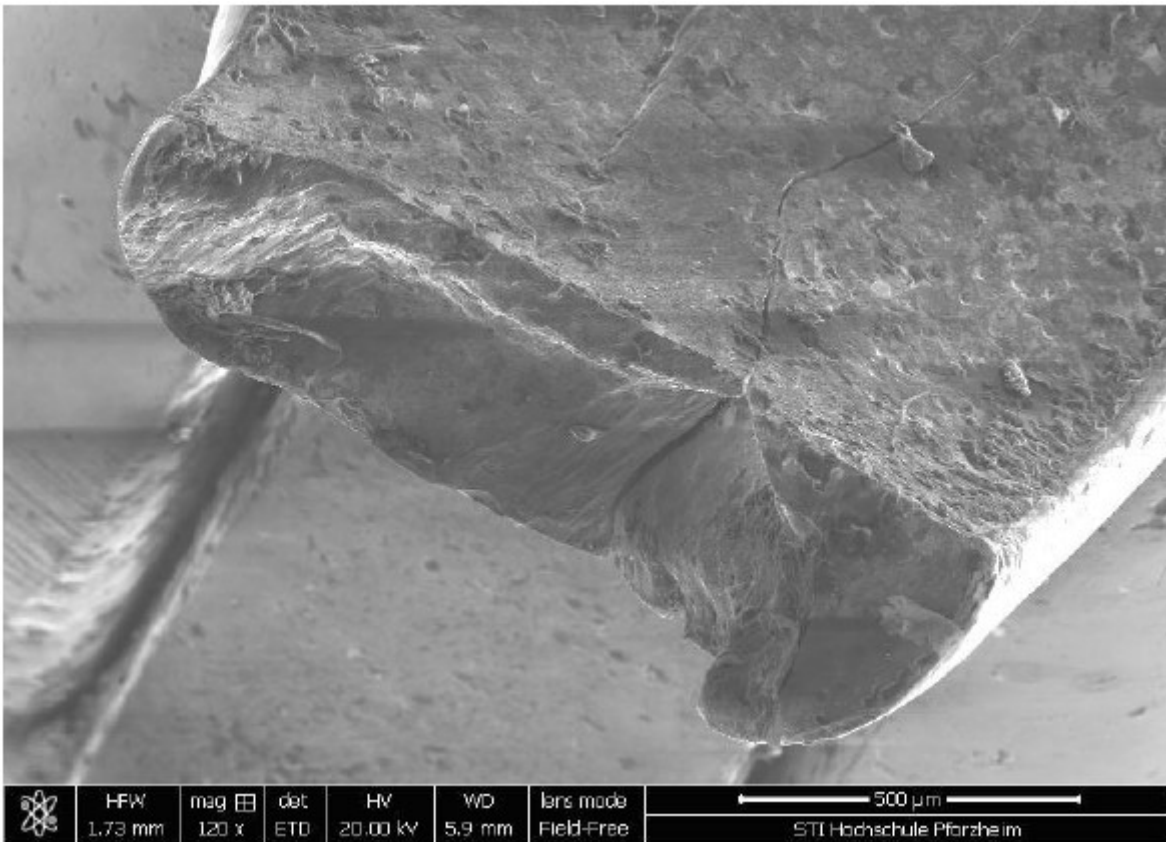
Stress corrosion cracking

Spannungsrisskorrosion

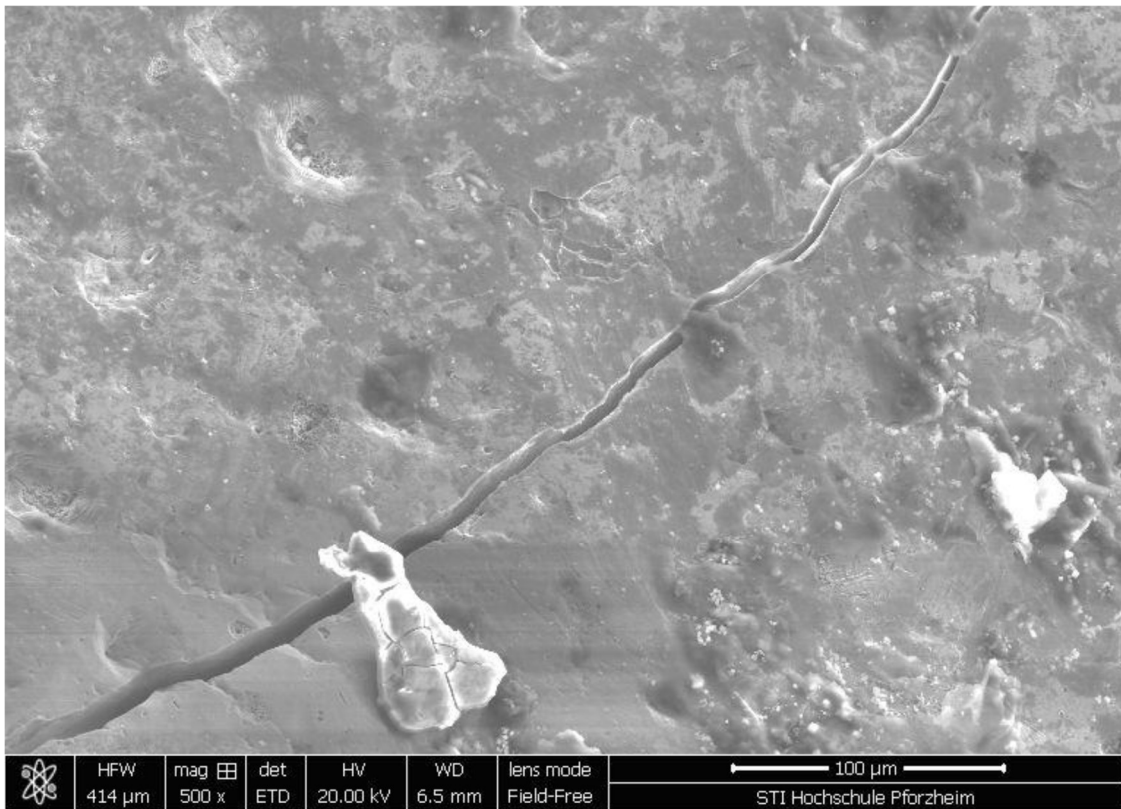
Who hasn't had a disappointed customer who has returned to your shop with a defective 8ct or 9ct piece of jewellery shortly after purchase or repair? In some cases, the jewellery parts have completely crumbled or the newly attached clasp has disintegrated into several components?

The most common cause of this physical destruction is stress corrosion cracking. This phenomenon occurs when cracks form in materials under the influence of stresses and corrosive media.

The stresses are caused by deformation, punching, bending or forging of materials. Corrosion can occur transcrystalline - through the grains (porosity) in the structure itself - or intercrystalline - along the grain boundary.



Scanning electronic image (SE signal) of the fracture surface (side 2) of the eyelet (120x magnification)



Scanning electronic image (SE signal) of the inner surface of the eyelet with radial crack (500x magnification)

The mechanism of stress corrosion cracking often begins with the formation of microcracks on the surface. The cracks can be favoured by tensile stresses and the protective surface layer is quickly breached. The corrosive medium can penetrate and further promote the formation of cracks.

Stress corrosion cracking is characterised by the fact that deformed alloys crack under the influence of certain chemicals without any apparent external influence. The main triggering influences are stress states, alloy composition and chemicals.

Low-carat alloys below a fineness of 585/- are particularly susceptible to stress corrosion cracking. For example, 8ct or 9ct often contains high levels of additives such as zinc. Such jewellery / findings / wires can be damaged even after a short period of wear, especially if they come into contact with corrosive substances such as ammonia, ammonium salts or sulphur dioxide.

These pieces of jewellery are therefore particularly at risk from environmental influences and wearing habits, e.g. sauna, swimming pool, sweat or cosmetics.

To avoid stress corrosion cracking, such jewellery should be given special care and protected from chemical influences.

In order to reduce the environmental influences on the workpiece and thus delay corrosion, the manufacturers recommend positively influencing the sensitivity with galvanic cover layers.

- Surface of the products Thermal treatment
- Surfaces should be gold-plated at least 3-5µm, colour gold-plating is not suitable.
- Daily cleaning of the products after wearing