Stress-Corrosion Cracking of Titanium Alloys

Titanium (Ti-6Al-4V) fuel tank within project Apollo failed in test because of stress-corrosion cracking caused by contamination prior to heat treatment.

Stress-corrosion cracking of titanium (Ti-8Al-1Mo-1V) immersed in 3%NaCl-solution.
Titanium alloys

- High strength to weight ratio
- Aerospace industry

Stress-Corrosion Cracking

- Tensile stress
- Corrosive environment
- Susceptible alloy

Copper contact

- Welding electrodes
- Fixtures
Test method

- Test method adapted from SAE ARP1795A
- Ti-8Al-1Mo-1V, Ti-6Al-2Sn-4Zr-2Mo, Ti-6Al-4V
- Validated by samples of no contact, sputtered Au and 3%NaCl-solution

Conclusions

- Adapted test method from SAE ARP 1795A can be used in order to evaluate SCC induced by solid metals.
- Ti-8Al-1V-1Mo and Ti-6Al-2Sn-4Zr-2Mo is susceptible to SCC in contact with copper at 480°C with an incubation time of 8h.
- Copper do not induce SCC in Ti-6Al-4V at 480°C with an incubation time of 8h