September 2021

The Role of Hydrogen on the Corrosion of Titanium

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Inspiring Minds 2021 Submission – Adam Morgan - 250922298

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Titanium is a metal that has excellent corrosion resistance and is highly biocompatible. For these reasons, it is widely used in the chemical processing, aerospace, and biomedical industries. Due to these extreme applications, it is critical to understand the corrosion of titanium, as corrosion can lead to damage to infrastructure, loss of productivity, and damage to human health. Although titanium has phenomenal corrosion resistance, it is still susceptible to cracking due to hydrogen absorption. Cracking occurs when a significant amount of hydrogen has been absorbed into the metal, combined with enough tensile stress (i.e. the action of stretching). My research focuses on the role of hydrogen on the corrosion of titanium and comparing the performance of different titanium alloys in environments containing high amounts of hydrogen. During my graduate studies, I will make strides in this area of research, leading to the safer use of titanium.