

Review of: "Effect of ultrasonic surface deep rolling combined with oxygen boost diffusion treatment on fatigue properties of pure titanium"

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Potential competing interests: The author(s) declared that no potential competing interests exist.

The authors investigated influence of **ultrasonic surface deep rolling (USDR), oxygen boost diffusion (OBD), and their combination (USDR-OBD)** of the surface hardening of pure titanium. **USDR treatment induced a severe deformation area, while OBD treatment produced a brittle oxygen diffusion zone. The results were interesting, and the paper is well written. The USDR-OBD treated samples approached the highest hardness in comparison with other treated samples. The fatigue lives of USDR treated samples were improved. However, the fatigue lives of both OBD treated samples and USDR-OBD treated samples were decreased due to premature crack initiation and rapid propagation in the oxygen diffusion zone.**

There are some of my points about the paper:

- 1. Figure 4. How the authors figure out the depth or thickness of the Oxygen diffusion layer? I think it is better to put the Oxygen distribution.**
- 2. Figure7 is badly organized.**