Mechanism of Anodic Growth of Tubular Titania

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Keywords: Anodic titania, tubular structure, growth mechanism.

Abstract: The anodic growth conditions of titania with a tubular structure are investigated. We propose a mechanism of anodic growth of tubular titania, which presupposes that electrochemical oxidation of titanium is predominantly confined to the bottom of pores in a barrier layer, i.e., where the anodic current density is higher, which causes a temperature rise in these regions. As the barrier layer temperature exceeds a certain threshold, the structure of growing oxide changes from the commonly obtained porous honeycomb-like structure to a tubular one. The proposed mechanism is supported by experimental results.

This article published in: Mechanism of Anodic Growth of Tubular Titania / S. K. Lazarouk [and others] // Technical Physics. – 2020. –Vol. 65. – P. 715-722. – https://doi.org/10.1134/S1063784220050138.

Internet link to this article:

https://link.springer.com/article/10.1134/S1063784220050138.