
Elaboration and characterization of Gum metal thin films obtained by dc magnetron sputtering.

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Abstract

Elaboration and characterization of Gum metal thin films obtained by dc magnetron co-sputtering.

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Abstract:

”Gum Metal”, which is a registered trademark of Toyota Central R&D Labs, corresponds to complex bulk titanium-based alloys containing initially Nb, Ta, Zr and O, and presenting the β -bcc structure. In the cold-worked conditions, these alloys are characterized by a high strength, ultra-low elastic modulus, high yield strain and excellent cold workability. These properties triggered a large interest about this kind of material. Indeed, in this paper, a new route to deposit this type of material as thin film which is deposited by dc magnetron sputtering is investigated. Gum metal thin films (GMTF) have been elaborated directly from pure metals targets by dc magnetron co-sputtering of four metals targets;Ti, Nb, Ta and Zr. The influence of the chemical composition, deposition temperature on the microstructure and morphology was studied using x-ray diffraction XRD and SEM scanning electron microscope. Nanoindentation tests were also performed in order to determine hardness and Young modulus and study the relationships between deposition parameters, microstructure

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and mechanical proprieties.

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