

# **Structure and surface morphology optimization of Nickel and Titanium thin film to their uses as Neutron guide**

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## **Résumé**

Neutron guides are optical components that allow the selecting and transporting neutrons by total reflection phenomenon away from the reactor core without significant losses of energy and intensity. These guides consist of metallic reflectors coating, thin layers of nickel and titanium are part of these coating because it has a high scattering length density [1-2]. In this work we will present an optimization of nickel and titanium thin film deposition parameters in order to obtain suitable structures. Mono-layers and multi-layers were prepared by using home dual magnetron sputtering system developed jointly by UR-UMB Boumerdes and Nuclear Research Centre of Birine (CRNB) [3]. Obtained nano-structured materials were investigated by using surface/in volume techniques (Reflectometry, GIRD, RBS and AFM). Correlations between crystalline structure, surface morphology, optical & electrical properties and deposition parameters were highlighted. Reflectivity simulations by using Parratt formalism (parratt-32 software) were done for nickel and nickel/titanium structure to converge to the required optimization [4].

**Keywords:** Thin film, Neutron guide, reflectivity, magnetron sputtering, neutron.

## **References**

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