

Accepted Manuscript

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PII: S0040-6090(14)00640-3
DOI: doi: [10.1016/j.tsf.2014.05.065](https://doi.org/10.1016/j.tsf.2014.05.065)
Reference: TSF 33506

To appear in: *Thin Solid Films*

Received date: 19 December 2013
Revised date: 14 May 2014
Accepted date: 27 May 2014



Please cite this article as: A.S. Ramos, A.J. Cavaleiro, M.T. Vieira, J. Morgiel, G. Safran, Thermal stability of nanoscale metallic multilayers, *Thin Solid Films* (2014), doi: [10.1016/j.tsf.2014.05.065](https://doi.org/10.1016/j.tsf.2014.05.065)

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Thermal stability of nanoscale metallic multilayers

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Abstract

Metallic nanolayered thin films/foils, in particular Ni/Al multilayers, have been used to promote joining. The objective of this work is to evaluate the thermal stability of nanoscale metallic multilayers with potential for joining applications. Multilayers thin films with low (Ti/Al and Ni/Ti), medium (Ni/Al) and high (Pd/Al) enthalpies of exothermic reaction were prepared by dual cathode magnetron sputtering. Their thermal stability was studied by: i) differential scanning calorimetry combined with X-ray diffraction (XRD), ii) in-situ XRD using cobalt radiation, and iii) in-situ transmission electron microscopy. It was possible to detect traces of intermetallic or amorphous phases in the as-deposited short period (bilayer thickness) multilayers,

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