

Accepted Manuscript

Thin-film adhesion characterization by colored picosecond acoustics

A. Devos, P. Emery



PII: S0257-8972(18)30843-0
DOI: doi:[10.1016/j.surfcoat.2018.07.097](https://doi.org/10.1016/j.surfcoat.2018.07.097)
Reference: SCT 23688
To appear in: *Surface & Coatings Technology*
Received date: 23 March 2018
Revised date: 19 June 2018
Accepted date: 5 July 2018

Please cite this article as: A. Devos, P. Emery , Thin-film adhesion characterization by colored picosecond acoustics. Sct (2018), doi:[10.1016/j.surfcoat.2018.07.097](https://doi.org/10.1016/j.surfcoat.2018.07.097)

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Thin-film adhesion characterization by Colored Picosecond Acoustics

A. Devos^{a*}, P. Emery^b

^a IEMN – UMR8250 CNRS – Avenue Poincaré BP 69 – 59652 Villeneuve d'Ascq cedex - France

^b MENAPiC, 41 Boulevard Vauban, 59046 Lille, France

Abstract

This paper presents some applications of a recent technique so-called the Colored Picosecond Acoustics (APiC) to the characterization of complex stacks of thin films. The technique is a unique combination of optics and acoustics that implements an acoustic pulse-echo technique at the nanoscale using a tunable ultrafast laser. From the experimental point of view, it is a full optical setup, acoustics taking place in the sample only. Very high frequency acoustic waves (up to several hundreds of GHz) are emitted and detected using ultra-short laser pulses. The capabilities of the APiC technique are demonstrated on various thin-film samples made of metals, dielectrics and semiconductors. Ultra-high frequency acoustic waves are first used to assess the film thickness or to measure thin-film elasticity via the acoustic time-of-flight measurement. A great potential is the capability to detect adhesion defects at buried interface through an analysis of the acoustic reflection at the concerned interface. Acoustic mapping of the sample surface reveal, in non-destructive manner, weak points at the buried interface.

Keywords: adhesion; thin film; thickness; ultrafast acoustics.

* Corresponding author: Arnaud.Devos@isen.iemn.univ-lille1.fr, tel +33.359574402, fax +33.320304051, IEMN Dpt ISEN, 41 Bd Vauban, 59046 Lille cedex - France

Download English Version:

<https://daneshyari.com/en/article/8023177>

Download Persian Version:

<https://daneshyari.com/article/8023177>

[Daneshyari.com](https://daneshyari.com)