FIB CONTRIBUTION FOR TECHNOLOGICAL ANALYSIS

THALES

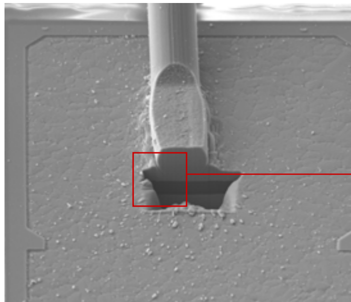
Hélène CHAUVIN, Gérald GUIBAUD – THALES

Moreno Floris, Guy PEREZ, Florie MIALHE, Philippe PERDU – CNES

cnes CENTRE NATIONAL D'ÉTUDES SPATIALES

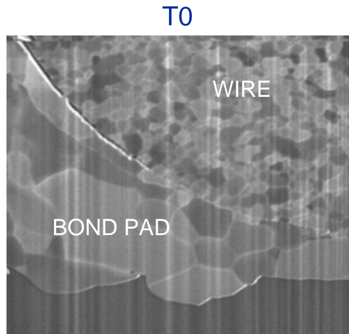
FIB channelling ion contrast / Metallurgical issue

Context: Poor adherence of the interface stitch/pad induced a bond lift rupture mode. FIB channelling ion contrast is used to characterize the interface quality at T0 and after two steps of thermal ageing: 48hrs and 1000hrs @ 150°C.



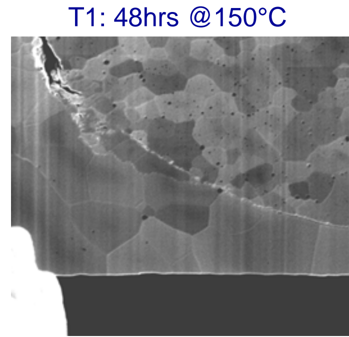
FIB X section on an aluminum bonding stitch

T0



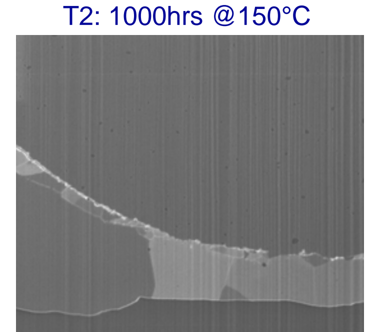
Smaller grain structure of the Al wire than the Al bond pad

T1: 48hrs @150°C



Beginning of Al grain growth on the wire and the bond pad

T2: 1000hrs @150°C

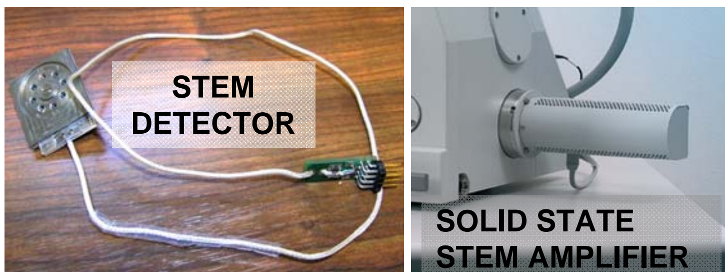


Larger grain structure of the Aluminum wire and bond pad

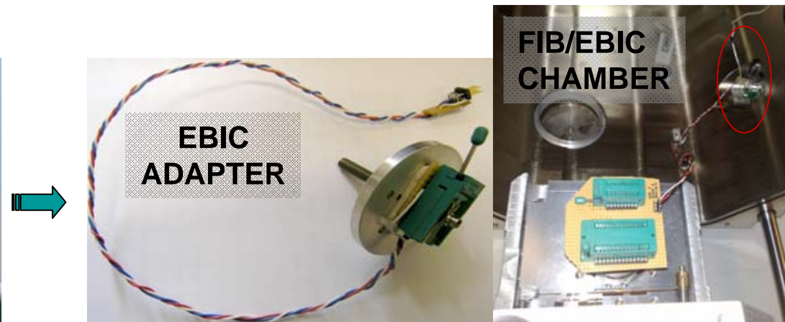
FIB Channelling ion contrast illustrated that thermal ageing induces an aluminum grain size growth that improves the stitch adherence. Those results were correlated with bond pull test.

FIB / EBIC

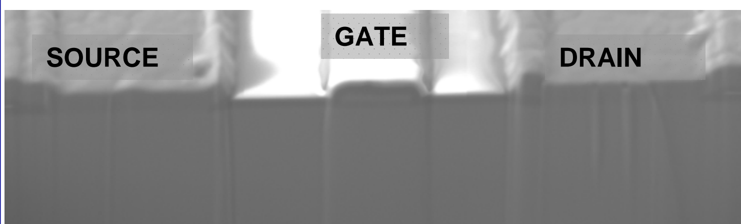
Purpose: Implement EBIC on a dual beam FIB by re-routing the STEM detector. (idea of Prof. Massimo Vanzi at the University of Cagliari (*UniCA*))



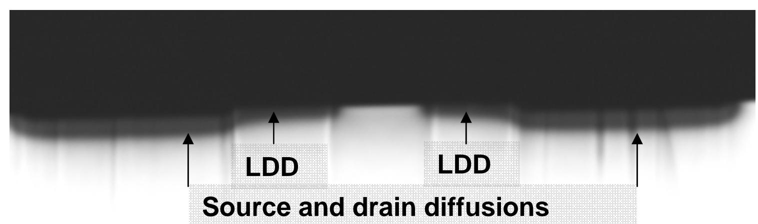
The inspection of TEM lamellas is the original purpose of the STEM detector. It collects electrons and feeds the resulting current to the Solid state STEM amplifier



A custom sample holder replaces the STEM detector to process and display an EBIC signal



SEM view of the FIB X section on a MOSFET transistor



EBIC inverted signal of the MOSFET transistor

FIB / EBIC highlights the vertical structure of the devices without the need of probe needles.