



TECHNOLOGY READINESS LEVEL: 3

BASIC CONCEPTS HAVE BEEN DEMONSTRATED ANALYTICALLY

US PATENT PENDING

TECHNOLOGY SUMMARY

Numerous commercial and military applications require knowing the absolute age and/or temperature history of a device or system starting from the time it is assembled or commissioned. Ideally this information could be obtained simply and without power. The Sandia-developed age and temperature history sensor is a physical materials system solution to address this need.

Sandia's passive sensor is based on diffusion of one metal into another, or into a semiconductor, as a function of time and temperature. This new technology leverages two similar sensors with different activation energies, as illustrated in Figure 1. Sensors can be conductive, capacitive, optical, visual or crystalline. Devices can be created using standard metal deposition techniques on common semiconductor and micro-device substrates, including sputter coating, chemical vapor deposition and electrochemical methods.

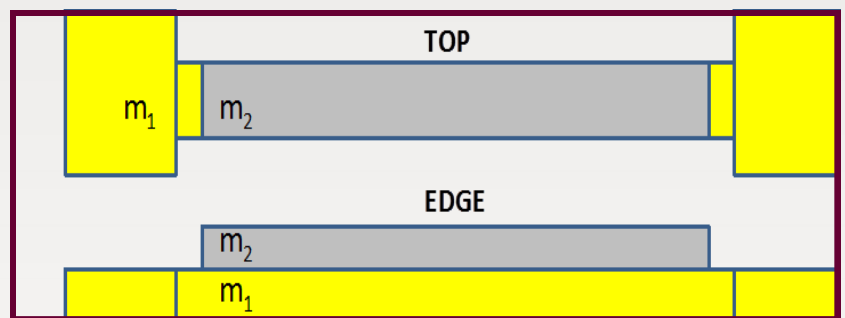


Figure 1. Schematic of Two-Component Age Sensor.

Examples:

M_1 = gold
 M_2 = tungsten
 M_1 =silicon
 M_2 =copper

POTENTIAL APPLICATIONS

Removal/Replacement of
Systems Exposed to
Extreme Environments

Verification/Invalidation of
Warranty Claims

TECHNOLOGICAL BENEFITS

Does not require power during
the aging period

Can determine absolute age
independently of temperature
history

Suitable for emplacement on
circuit boards

TECHNOLOGY INQUIRY?

For more information or licensing
opportunities contact us at

ip@sandia.gov

Refer to SD # 11622

or visit

<https://ip.sandia.gov>

