

## Investigation of Al/Si, Au/Si and Au/GaAs Interfaces by Positron Annihilation Spectroscopy

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**Abstract :** The importance of metal-semiconductor interfaces comes from the fact that most electronic devices are interconnected using metallic wiring that forms metal-semiconductor contacts. The properties of these contacts can vary considerably depending on the nature of the interface with the semiconductor. Variable-energy positron annihilation spectroscopy has been applied to study interfaces in Al/Si, Au/Si, and Au/GaAs structures. A computational modeling by ROYPROF program is used to analyze Doppler broadening results in order to determine kinds of regions that positrons are likely to sample. In all fittings, the interfaces are found 1 nm thick and act as an absorbing sink for positrons diffusing towards them and may be regarded as highly defective. Internal electric fields were found to influence positrons diffusing to the interfaces and unable to force them cross to the other side. The materials positron affinities are considered in understanding such motion. The results of these theoretical fittings have clearly demonstrated the sensitivity of interfaces in any fitting attempts of analyzing positron spectroscopy data and gave valuable information about metal-semiconductor interfaces.

**Keywords :** interfaces, semiconductor, positron, defects

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