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Metal Contacts to High Resistivity Semiconductors

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Contacts are often key components in high resistivity devices. Many textbooks describe in details Schottky and Ohmic contacts, however the discussion is usually limited to contact on low resistivity semiconductors. Such textbook case would imply the use of depletion approximation, etc. Even numerous scientific publication discussing contacts on wide band-gap, high resistivity semiconductor, such as CdTe and CdZnTe, utilize the simplified textbook description. It is shown that the use of such approximations is not suitable for high resistivity material, and that rough hand calculations may not be satisfactory.
This study used ISE-TCAD computer simulation to describe the current conduction and the electric field distribution in high-resistivity CdTe Metal-Semiconductor-Metal (MSM) structure under bias. It is shown that even in the case of small Schottky barrier the current may be dominated by minority carriers, and that the textbook approximation is totally inappropriate.

Author: RUZIN, Arie (Tel Aviv University)

Presenter: RUZIN, Arie (Tel Aviv University)

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