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Silicide Contact for Shallow Junction Devices

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The miniaturization of a large scale integrated electronic device requires dimensional shrinkage in both its lateral and vertical directions due to scaling. In shrinking the vertical dimension, a shallow junction bipolar device, for example, needs a shallow contact, otherwise the contact may approach the junction. In forming a silicide contact, it consumes silicon from the substrate. We anticipate that such a contact may not consume more than 20nm of the silicon as the dimensions become smaller and smaller, hence there is a need to develop such contacts as well as understand their properties. In this talk, a general scheme of making shallow silicide contacts using refractory metal alloys and Si alloys will be reviewed, including their Schottky barrier height and thermal stability in the presence of an aluminum overlayer. The effect of low temperature snowplow of dopant by a moving silicide-silicon interface on electrical property of rectifying and ohmic contacts will be discussed.