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Integration Process of Variable Capacitors Using Barium Strontium Titanate Thin Film Deposited at High Temperature

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Summary:

This study focused on an integration process to transfer BST films deposited on a Si wafer to another wafer by polyimide-based wafer bonding and lost wafer technique. Although BST with good voltage tunability of permittivity is deposited at high temperature, this process allows us to use BST films on thermally-sensitive wafers. If a BST film is exposed to SF₆/Ar plasma, its nominal dielectric constant considerably decreases, because Ba and Sr fluorides with low dielectric constants are formed on the surface. This plasma-induced damage problem was solved, and finally a working BST variable capacitor was fabricated on a dummy circuit wafer.