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Abstract:
Using SIPOS films (SiO x , x < 2) as an emitter contact has been previously shown to reduce the emitter saturation current, J oe , by at least a factor of fifty when compared to a conventional emitter structure with a metallic contact. Previous attempts to explain this J oe reduction have focused on the bulk properties of the SIPOS films. Experimental results of this study which attained J oe values of 2×10^{-14} A/cm ^{2} , suggest that an interfacial layer between the SIPOS and underlying silicon may play an important if not dominant, role with the implication that the high oxygen concentrations previously used may not be essential for J oe reduction. This would permit the use of lower oxygen content SIPOS films whose lower bulk resistivities would allow utilization of these films in structures such as scaled VLSI bipolar devices and high concentration point contact solar cells where series resistance is detrimental to device performance.

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