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(54) **DILUTE GROUP III-V NITRIDE INTERMEDIATE BAND SOLAR CELLS WITH CONTACT BLOCKING LAYERS**

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This patent is subject to a terminal disclaimer.

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See application file for complete search history.

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(57) **ABSTRACT**

An intermediate band solar cell (IBSC) is provided including a p-n junction based on dilute III-V nitride materials and a pair of contact blocking layers positioned on opposite surfaces of the p-n junction for electrically isolating the intermediate band of the p-n junction by blocking the charge transport in the intermediate band without affecting the electron and hole collection efficiency of the p-n junction, thereby increasing open circuit voltage (V_{OC}) of the IBSC and increasing the photocurrent by utilizing the intermediate band to absorb photons with energy below the band gap of the absorber layers of the IBSC. Hence, the overall power conversion efficiency of a IBSC will be much higher than an conventional single junction solar cell. The p-n junction absorber layers of the IBSC may further have compositionally graded nitrogen concentrations to provide an electric field for more efficient charge collection.

17 Claims, 8 Drawing Sheets

