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(54) Title: MULTIJUNCTION HYBRID SOLAR CELL WITH PARALLEL CONNECTION AND NANOMATERIAL CHARGE COLLECTING INTERLAYERS

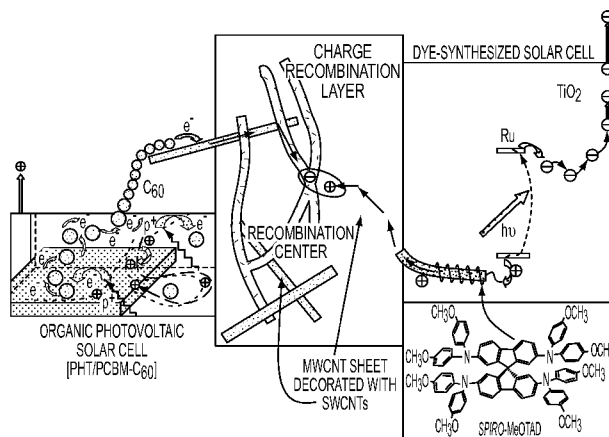


FIG. 27

(57) Abstract: A tandem (or multijunction) hybrid photovoltaic device (PV) device comprised of multiple stacked single PVs connected in parallel with each other is described herein. Furthermore, nanomaterials are used as transparent charge collecting electrodes that allow both parallel connection via anode interlayer and also "inverted parallel" connection via cathode type interlayer of different types of solar cells. Carbon nanotube sheets are used as a convenient example for the charge collecting electrodes. The development of these alternative interconnecting layers simplifies the process and may be also used for combined organic PVs with traditional inorganic PVs and Dye Sensitized Solar Cells (DSSC). In addition, novel architectures are enabled that allow the parallel connection of the stacked PVs into monolithic multi-junction PV tandems. This new monolithic parallel connection architecture enables enhanced absorption of the solar spectrum and results in increased power conversions efficiency. Moreover, architectures where cells are stacked monolithically using a series connection can be coupled with cells to create mixed series and parallel connected tandem cells.

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