Thickness Variation of Optical Spacer By Using Poly (Methyl Methacrylate) (PMMA) on the Performance of a Four Terminal Mechanically-Stacked Tandem Solar Cell

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We study the effect of thickness variation of poly (methyl methacrylate) (PMMA) as optical spacer on the performance of four terminal mechanically- stacked tandem solar cell. This is done by using a semi-transparent NIPCH3NH3PbI3 perovskite (top cell) solar cell (area=0.1-1 cm2) with an architecture of glass/ITO-front/SnO2/PCBM/CH3NH3PbI3/spiro-OMeTAD/ITO-rear mounted on top of a crystalline Si interdigitated back contact (IBC) solar cell (bottom cell) using PMMA as optical spacer. To simulate the effect of PMMA thickness as optical spacer on the performanceof our 4-electrode tandem cell, the Transfer-Matrix-Based Optical Simulation (TMM) method was used. The purpose of the work is to investigate the use of PMMA as an optical spacer and provide an outlook for the optimum spacer thickness for PMMA in a 4-terminal perovskite/Si tandem solar cells structure for maximum overall short circuit current (Jsc).

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