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This paper presents for a first time a solution-processable ZnPc thin films from formic acid (FA) solution by drop casting method and the photovoltaic parameters of the Organic Solar Cells (OPV) based on ZnPc-diode Schottky. Structural and optical properties of ZnPc thin films were investigated by X-ray diffraction (XRD), Fourier transform infrared spectroscopy (FTIR) and UV-VIS spectroscopy. XRD analysis show phase transformation of the alpha-beta phases of ZnPc thin films to beta phase due to the annealing in H₂ atmosphere at 400 °C for 30 min. FTIR analysis show that the formate ion (HCOO⁻) is attached to Zn(II)Pc. Further on, ITO/PEDOT: PSS/ZnPc(I₂)/Al Schottky photovoltaic devices with efficiency of 0.3 % were prepared and their characteristics enhancement is discussed. The values for the open circuit voltage (1.03 V) and the current density (8.2 μA/cm²) are higher than in the case of Schottky diode devices obtained by thermal vacuum evaporation.