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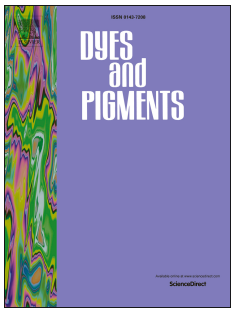

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Abstract: Solvent vapour annealing (SVA) treatments have been proven to be an efficient approach to optimize the morphology of the active layer in bulk heterojunction polymer solar cells. For an alternating polymer based on dioctylthiophene substituted benzo[1,2-b:4,5-b']dithiophene and 4,7-di(4-hexyl-thiophen-2-yl)-5,6-difluorine-2,1,3-benzothiadiazole (**PBDTT-DFDTBT**), enhanced power conversion efficiency (PCE) from 7.65% to 8.06 % was achieved in regular device configuration as ITO/PEDOT:PSS/**PBDTT-DFDTBT**:phenyl-C71-butyric acid methyl ester ($PC_{71}BM$)/poly(9,9-bis(3-(N,N-dimethylamino)propyl)-2,7-fluorene)-*alt*-2,7-(9,9-dioctylfluoren)(PFN)/Al after tetrahydrofuran (THF) SVA treatment. As for the inverted device configuration of ITO/ZnO/PFN/**PBDTT-DFDTBT**:$PC_{71}BM$/MoO_3/Al with THF SVA post-treatment, simultaneously decreased open-circuit voltage (V_{OC}) and short-circuit current density (J_{SC}) were obtained, giving rise to a reduced PCE of 6.60%. We observed