Supplementary material

Vertical and lateral morphology effects on solar cell performance for a thiophene-quinoxaline copolymer:$PC_{70}BM$ blend.

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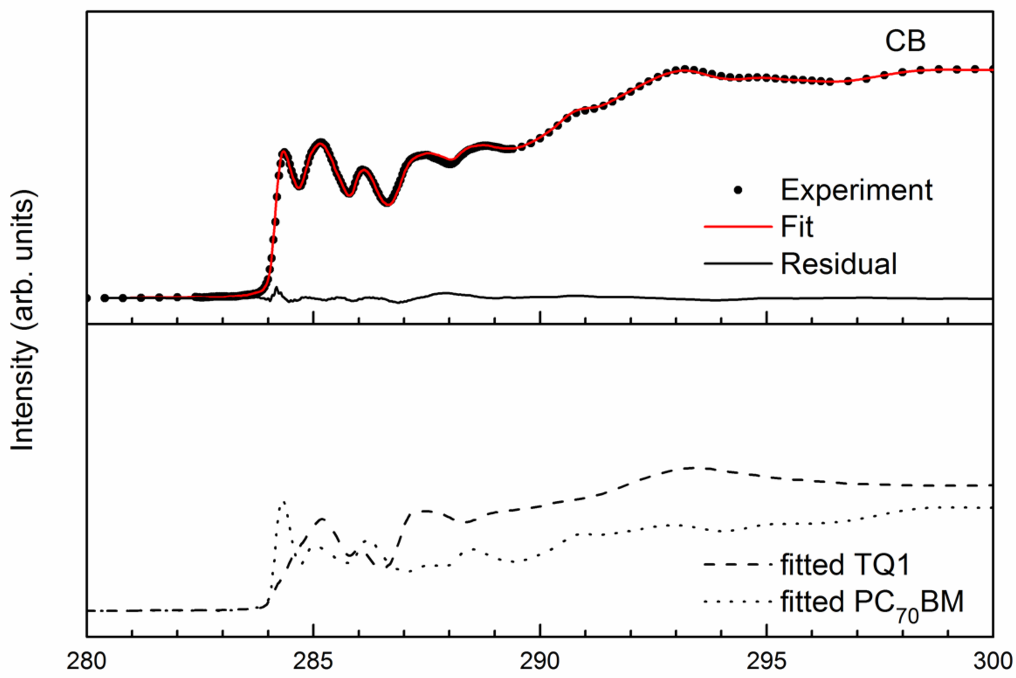

Figure S1. C1s NEXAFS spectrum measured at 55° on a 1:3 w/w TQ1:PC_{70}BM blend film from CB, measured in TEY mode together with the best fit and the residual. Shown below are the fitted components extracted from the fit.

Interpretation of the m/q = 26 d-SIMS depth profile

The secondary ions with m/q = 32 can exclusively be assigned to S^- from TQ1. The secondary ions with m/q = 26, can however, apart from the main assignment to CN^- from TQ1, also be assigned to $C_2H_2^-$ ions, which can originate both from the polymer and the fullerene. Therefore the m/q = 26 profile is strictly speaking a mixed signal that originates from both components in the blend. (This is apparent from our observation that the m/q = 26 signal is present also in the PS layer despite there being no nitrogen in PS.) However, since CN^- ions can only originate from TQ1 and assuming that the $C_2H_2^-$ part of the signal is contributed from TQ1 and $PC_{70}BM$ in a constant ratio, this signal should also show how the TQ1 concentration varies through the film. If this assumption is correct, any changes in the m/q = 26 signal are due to changes in the TQ1 concentration. This is indeed supported by the fact that the depth profiles for m/q = 32 and m/q = 26 have very similar shapes throughout the active layer for all the blend films. Therefore, in the active layer, we can confidently interpret both the signals from m/q = 26 and m/q = 32 as markers for TQ1 concentration.