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Reproducibility Go

Low Molecular Weight Polymers Affect the Bench-mark OPV Material System of Y6-PM6

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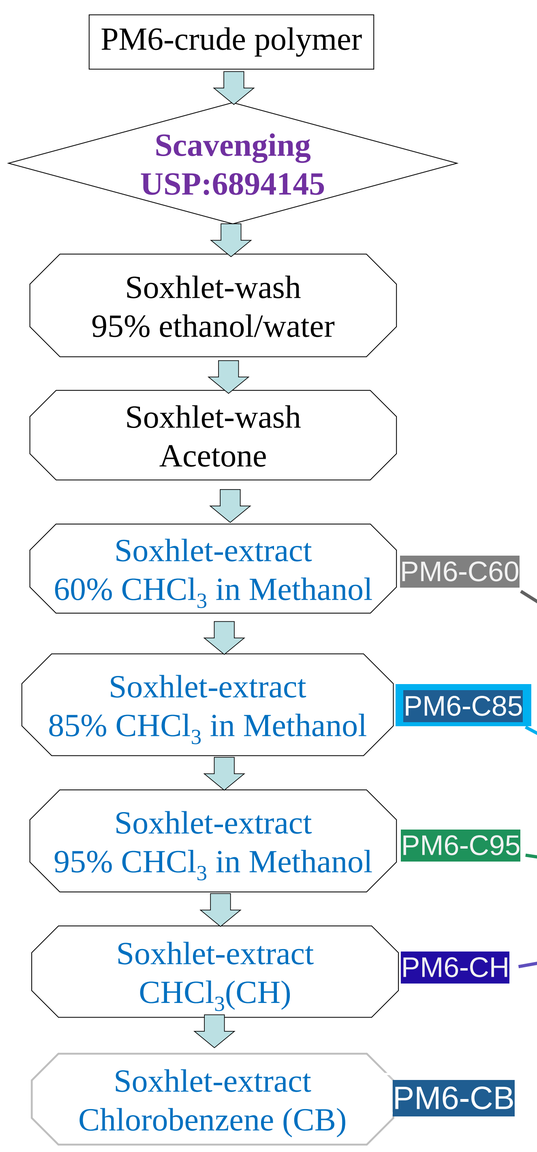
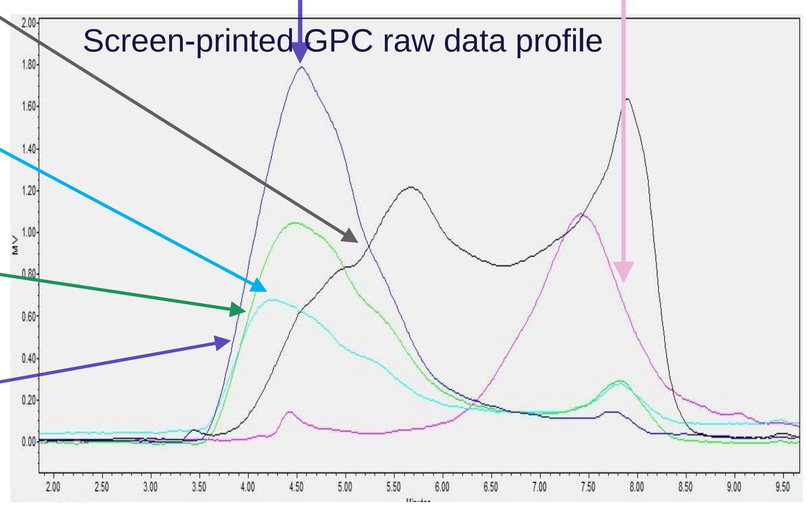
Abstract

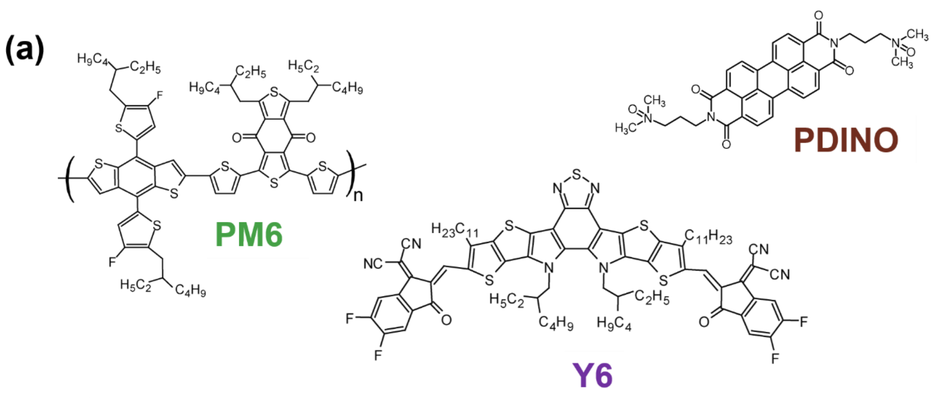
This poster presents additional information to the paper: ***Energy Environ. Sci.***, 2020,**13**, 3679-3692.

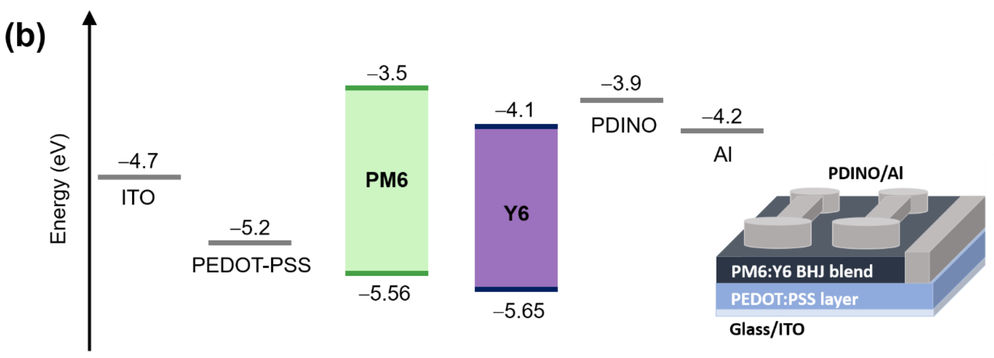
Low Mw polymers or oligomers are unavoidable during polymerization, and difficult to be cleaned out during purification. Higher (5%) content of low Mw polymers in BHJ active layer may compromise charge generation efficiencies, increase bulk trap densities, reduce competition factors and charge transport, result in lower J_{SC} , *FF* and *PCE* ultimately.

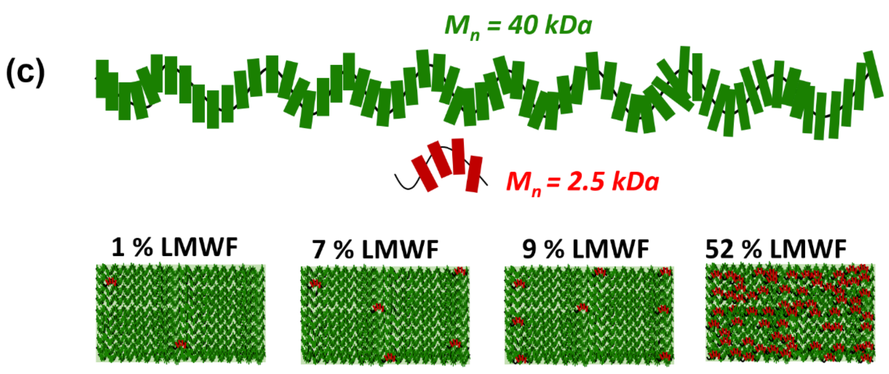
Exampled Results











PM6 / %LMwF	V_{OC} (V)	J_{SC} (mA cm^{-2})	FF	Ave. PCE (Max) [%]
PM-C60/1% LMwF	0.83 ± 0.003	25.5 ± 0.7	0.712 ± 0.02	15.0 ± 0.4 (15.35)
PM6-C85/7% LMwF	0.846 ± 0.003	20.6 ± 1.2	0.681 ± 0.02	11.8 ± 0.6 (12.9)
PM6-C95/9% LMwF	0.843 ± 0.005	20.4 ± 1	0.646 ± 0.02	11.1 ± 0.5 (12.3)
PM6-CH/ 52% LWMF	0.85 ± 0.006	12.0 ± 0.7	0.51 ± 0.02	5.2 ± 0.5 (5.7)

Suggestions

(1) Synthesized PM6 often exhibits bimodular Mw distribution with medium Mw of ~100K and low Mw < 10K (polymerization degree <5).
(2) 5+% of low Mw degrades the OPV performance of PM6-Y6 system.
(3) PM6 in chloroform is not stable at room condition; science behind breaking polymeric chains is to be further studied.

A chemical is not a material until its function is reproducibly performed against elapsed time