

ITIC vs half-ITIC: a direct comparison of their synthesis, device characteristics and solid-state photo physical processes

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Major contributors to the revival of the organic photovoltaic (OPV) field, non-fullerene acceptors (NFAs)¹ have attracted in recent years considerable research interest and efforts. As a result, power conversion efficiencies now exceed 15% in single junction solar cells. Among the various reported molecular architectures, indacenodithiophene (IDT)² and indacenodithieno[3,2-b]thiophene (IDTT)-based fused-ring electron acceptors are now clearly at the head of the pack.³ However, prices of such NFAs are hovering around a thousand dollars per gram, taking them away from a potential industrial commercialization and large solar cell manufacture.

In this context, we devoted our efforts in designing novel simple and cheaper electron acceptors. Based on indeno-[1,2-*b*]thieno-[2,3-*d*]thiophene (ITT) fused core, the considered structures actually corresponds to half of well-known ITIC derivatives. With this simple but efficient strategy, we both addressed the reduction of synthesis expenses and the exploration of vacuum processed organic solar cells which still remains a challenge with IDT and ITIC based molecules. Hence, beyond the direct comparison of their synthesis and devices characteristics, an in-depth solid-state photo physical investigation of the processes involved in bulks will be discussed.

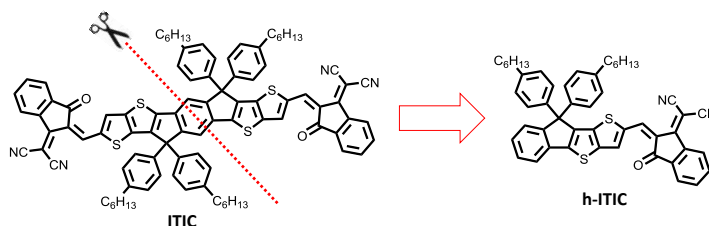


Figure 1 – Molecular engineering

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