

## Doping of Donor–Acceptor Polymers via Solution Mixing for Advancing Thermoelectric Properties

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One-step doping of conjugated polymers by solution mixing is typically performed instead of sequential doping because of its simplicity. However, doped polymer solutions often exhibit poor solubility, and the dopants present in the produced films can disturb the molecular ordering of polymer structures. In this work, effective pairs of two donor–acceptor (D–A) type polymers and a molecular dopant characterized by high solution stability and thermoelectric properties of the prepared films are reported. The long side chains in the polymers preserve their original solubilities and crystallinity in the solution and thin-film states, respectively, even at large amounts of added dopant (up to 38 mol%). Furthermore, the shallow HOMO levels of the D–A polymers enable efficient charge transfer from the dopant. Owing to their good charge transport properties, the doped D–A polymers exhibit outstanding thermoelectric power factors up to  $31.5 \mu\text{W}/\text{m}\cdot\text{K}^2$ , about 50 times higher than those of P3HT.