

### High enhancement in Thermoelectric Performance of PEDOT:PSS Thin Film by Incorporation of Small Amount of Graphene

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Graphene (1 ~ 3wt%) incorporated PEDOT:PSS thermoelectric thin films were prepared through a solution method with a spin coater. The thermoelectric thin films with graphene (1 ~ 3wt%) have higher values than PEDOT:PSS for the electrical conductivity, the power factor, and ZT because of graphene's enhanced carrier mobility ( $40,000 \text{ cm}^2\text{V}^{-1}\text{s}^{-1}$  at 300K). The electrical conductivity of PEDOT:PSS with 2wt% graphene in this experiment was 32.13 S/cm and the power factor was  $11.09 \mu\text{W/mK}$  without a reduction in the Seebeck coefficient. The ZT of PEDOT:PSS with 2wt% graphene was estimated to be about 0.024 at 300K, which is higher than the corresponding value for PEDOT:PSS ( $ZT=10^{-2}$  to  $10^{-3}$ ) and bulk Si ( $ZT=0.01$ ).