

Characteristics of Organic Thermoelectric Devices with Organic/Inorganic Hybrid Composites

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Organic thermoelectric devices have been spotlighted as a thermal energy conversion medium at a low and medium temperature range. In particular, organic thermoelectric devices are able to be fabricated on flexible film substrates so that their modules can be attached to a curved heat source including human bodies. To date, most organic thermoelectric devices have been fabricated using conducting polymers and their geometry has been limited in a planar structure because of difficulties leading to thick films enough for thermal gradients. Making thick films with conventional conducting polymer solutions requires a state-of-the-art technology with a limited level of repeatability owing to many issues including film shrinkage etc. Our group has recently demonstrated an organic thermoelectric device with a vertical geometry. In this presentation, we disclose that conducting polymer solutions can be sufficiently thick in viscosity by the addition of metal oxides. The detailed characteristics of organic thermoelectric devices are discussed together with fabrication processes.