

Latent polymer gel electrolytes for photoelectrochemical solar cells

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An electrolyte is an essential component of electrochemical devices. In general, a liquid electrolyte (LE) using a low viscosity organic solvent has been widely used to realize high ion conductivity. However, the use of LEs may act as a factor of deteriorating the durability of the electrochemical devices due to the leakage and volatilization. Therefore, it is possible to improve the durability of the electrochemical devices by using a quasi-solid electrolyte (QSE) rather than a LE. However, the QSEs have some problems that the ion conductivity is lower than that of the liquid electrolyte, and that the injection is difficult when manufacturing a large-area device. Therefore, in this study, we developed latent polymer gel electrolytes (LPGEs) which have proper viscosity and is easy to inject into the devices in liquid state and gelled by applying thermal stress after the injection. The developed LPGE was applied to the photoelectrochemical solar cell, showing high level of energy conversion efficiency and excellent durability. This work was supported by the Environmental Industry Advancement Technology Development Project funded by the MOE (No.2017000140002/RE201702218).