

All-solid-state supercapacitor with lignin electrode and electrolyte

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Lignin is the second most abundant natural polymer that can be extracted from wood biomass resources. Although lignin has lots of advantages such as low cost material, natural profusion, and industrial scale production, lignin has been largely treated as useless waste or was mostly used as the precursor of porous carbons. Therefore, the conversion of lignin into flexible nanofiber electrodes and gel electrolytes is anticipated to offer an innovative sustainable chemistry into the design of renewable and flexible energy storage materials as well as to extend the application fields of wood biomass. Here we have fabricated all-solid-state flexible supercapacitor exhibiting a maximum energy density and power density of 4.49 Wh kg^{-1} and 2.63 kW kg^{-1} , respectively by integrating the lignin-PAN nanofiber electrode and lignin hydrogel electrolyte.