

## Effects of Various Binders on Supercapacitor Performances

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Supercapacitor performances are influenced by binder types and contents in the electrodes. The electrochemical performances of activated carbon (AC) with Nafion, poly(tetrafluoroethylene) (PTFE) and poly(vinylidenedifluoride) (PVDF) and different contents of each binder were investigated by cyclic voltammetry (CV), galvanostatic charge discharge (GCD) and electrochemical impedance spectroscopy (EIS). The optimal content of binder in the electrode is 10 wt% for Nafion and PTFE, but only 5 wt% for PVDF. The specific capacitances of the AC electrodes with optimal content of Nafion, PTFE and PVDF are respectively 131.3, 156.6 and 160.6 F g<sup>-1</sup>; their corresponding specific capacitances retain 87%, 91% and 79.6% after 2000 CV cycles with a scan rate of 200 mV s<sup>-1</sup>. Therefore, PTFE is the best suitable binder for supercapacitors and its optimal content is 10 wt%.

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**Keywords:** supercapacitor; activated carbon; Nafion; PTFE; PVDF; binder

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