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**Jiwon Jang,** Woojin Lim, Jungwoo Huh
School of Mechanical Engineering, Korea University, Seoul 02841, Republic of Korea

## Tunable pseudocapacitance of electrospun carbon/iron–vanadium oxide nanofibers for high-energy-density flexible supercapacitors

**Abstract:** Highly flexible and conductive carbon nanofibers (CNFs) embedded with pseudocapacitive iron–vanadium oxide (FVO) were fabricated via electrospinning followed by high-temperature annealing (900 °C). CNFs have a graphitic structure with minimal defects, which could hinder the access of electrolytic ions to multivalent FVO. Therefore, a sacrificial polymer, such as poly(methyl methacrylate) (PMMA), was introduced to enhance the electrolytic ion pathways by altering the internal structure of nanofiber. In addition, terephthalic acid was added to a polyacrylonitrile–PMMA solution to facilitate flexibility by increasing the cross-linking of the electrospun fibers. The fabricated flexible FVO/CNFs exhibited significantly enhanced electrochemical performance. The optimal sample had a high areal capacitance of 1058 mF·cm−2 at a current density of 2.5 mA·cm-2 and showed 100% capacitance retention during long-term cycling (10,000 cycles). The capacitance retention decreased to 81.3% when the current density was increased to 25 mA·cm-2. The wider potential window of 0–1.6 V increased the energy density to 389 μW·h·cm-2. The optimal FVO/CNF sample maintained 90% capacitance retention after 200 bending cycles.

**Keywords:** Electrospinning, Multivalent FeVO4, Sacrificial polymer, Flexible supercapacitor, Electrochemical sites

**Biography:** Jiwon Jang is a Master's student in Mechanical Engineering at Korea University, specializing in energy materials. She is presenting her research on pseudo capacitance in carbon/iron–vanadium oxide nanofibers for supercapacitors.


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