Development of All-in-one, Green Supercapacitor from Cassava

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Supercapacitor is the one of sustainable alternative energy that serves to store electrical energy. The main components of the device consist of electrode and electrolyte. In this research, we aim to develop high-performance supercapacitor from renewable sources. Cassava was chosen because it is cheap and abundant in Thailand as it is one of the Thailand's economic crops. Cassava peel, a massive wastes, was converted into carbon dots and activated carbon, which was then used to fabricate electrodes. Cassava starch and salt were used to prepare electrolyte. Combining all components, the all-in-one, green supercapacitor from cassava was demonstrated. Carbon dots as additive were used to improve the charge capacitance of activated carbon. The best supercapacitor optimized in this project yielded a specific capacitance of 104.79 F/g with excellent cycle life over 100 cycles. Based on this work, we aim to simultaneously solve the problem of energy and environmental crises. Reducing agricultural wastes by turning them into valuable materials and energy storages devices will benefit various industries and Thailand as a whole.

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