

# CaO impregnated highly porous honeycomb activated carbon from agriculture waste: symmetrical supercapacitor study

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## ABSTRACT

This study presents the electrochemical studies of activated carbon prepared from palm kernel shell (ACPKS), with CaO impregnation. The CaO is obtained from chicken eggshell waste to produce CaO/ACPKS, which shows highly porous honeycomb structure with homogeneous distribution of CaO nanoparticles (30–50 nm in size). The prepared materials are evaluated as supercapacitor electrodes by testing their electrochemical characteristics. A high specific capacitance value of 222 F g<sup>-1</sup> at 0.025 A g<sup>-1</sup> is obtained for CaO/ACPKS, which is around three times higher than that for ACPKS (76 F g<sup>-1</sup>). In addition, electrochemical impedance data show lower impedance for CaO/ACPKS. Lastly, a practical symmetrical supercapacitor is fabricated by CaO/ACPKS and its performance is discussed.