

Two dimensional Ti₃C₂T_x MXene electrode for supercapacitor application

ABSTRACT

Two-dimensional materials are one of the most studied materials for many applications in recent years. Among the two-dimensional (2D) metal carbide, MXene is seen as one of the most promising materials for energy storage systems. Among the MXene family, Ti₃C₂T_x, the lightest material, is one of the electrode materials due to its unique electrochemical performance. In this study, Ti₃C₂T_x MXene structure was obtained by removing Al layer from Ti₃AlC₂ MAX structure by selective etching. Exceptional electrochemical performance and high electronic conductivity of Ti₃C₂T_x was obtained and surface and morphological analyzes were performed with FESEM, EDS, XRD. FESEM has demonstrated that synthesized MXene is a layered solid structure. In addition, synthesized MXene was tested for electrochemical behavior against electrochemical energy storage applications using techniques such as cyclic voltammetry (CV), galvanostatic charge discharge (GCD), and electrochemical impedance spectroscopy (EIS). Characterization and electrochemical tests have shown promising performance in electrochemical charge storage applications.