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(57) Abstract :

The present invention relates to a process for the preparation of high purity Ti3C2Tx MXene, with enhanced redox activity complemented by structural, optical and electronic properties by incorporating NaOH in the late etching stage. The technique avoids post etching delamination process to give Na-MX with all the properties of delaminated MXene. Appropriate optimization of the concentration of NaOH leads to successful removal of unetched MAX phase from MXene, by following the mild in situ HF etching technique. The obtained high purity Ti3C2Tx MXene was used as negative electrode, and the performance of asymmetric supercapacitor based on the said negative electrode was evaluated. The MXene/RuO2 asymmetric supercapacitor showed superior electrochemical performance with a specific capacitance of 73.3 F/g, energy density of 23 Wh/kg and power density of 796 W/kg, with potential extendable up to 2 volts.

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