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Abstract

An emerging class of 2D transition metal carbides and nitrides commonly known as MXene with a wide range of application particularly in energy storage has been introduced around a decade ago. The merits of hydrophilicity, good metallic conductivity as well as high surface redox reactions are the key factors for the high energy storage capability of MXene electrodes. Similarly (MOFs) and their derivative have their own merits like large surface area, high porosity, various active sites make them excellent candidate for storage devices. Careful tailoring of synergetic effect between two or more different materials can effectively enhance the activity and stability of any material than single component. Herein, a new study is conducted where Fe MOF is synergized with 2D MXene and then grown on Ni foam in a binder free scheme for supercapacitor application. The spacing between the MXene sheets is to be filled with Fe MOF to reduce the ion-electron diffusion pathways, as well as to limit MXene flakes from restacking. Electro chemical testing resulted with abundant of active sites as well as improved diffusion pathways. The as prepared MXene-Fe MOF electrode achieved an operational window of 0.7V.