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## Effects of Ion Implantation on Energy Storage Properties of Bulk Molybdenum Disulphide

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We report the effects of implanted molybdenum and tungsten ions on the capacitance of electrodes made from bulk molybdenum disulphide (MoS<sub>2</sub>). Six samples of crystalline MoS<sub>2</sub>, were modified by ion implanted. Three samples with Mo ions and three with W ions, at varying fluences and an acceleration voltage of 10 keV. The ion implantation process first simulated using the Stopping and Range for Ions in Matter (SRIM) software. This provided us with the simulated defect density in terms of vacancies and ion penetration depth. Raman Spectroscopy (RS) and Photoluminescence (PL) Spectroscopy have been used to give some insight into vibrational and optical properties respectively, before and after the ion implantation. Pseudocapacitance properties, specific capacities, performance and stability of the electrodes were measured using Electrochemistry techniques. Coulombic efficiencies, retention capabilities as well as the knee frequencies are measured as well. All our modified electrodes showed remarkable improvement on performance, especially in terms of specific capacity and % capacitance retention after 1000 cycles of charge and discharge, with reference to the pristine (as received) MoS<sub>2</sub> electrodes.

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