Jordan Milne et al., J Nanomater Mol Nanotechnol 2018, Volume 7
DOI: 10.4172/2324-8777-C7-039

Liquid-Liquid extraction of manganese oxides and fabrication of supercapacitor electrodes using octanohydroxamic acid

Jordan Milne, Ricardo Marques e Silva Silva and **Igor Zithomirsky**
McMaster University, Canada

Electrochemical supercapacitors (ES) are currently under development for energy and transportation sectors and electronic industry. For practical applications of ES, high active mass loading is nesseccary. Particle agglomeration is detrimental to most material synthesis processes and restricts electrochemical performance. In order to avoid such agglomeration, liquid-liquid extraction methods have been developed to extract particles synthesized in an aqueous phase to an organic phase. Particle extraction through a liquid-liquid interface (PELLI) enables particles from an aqueous synthesis medium to transfer directly to an organic phase, circumventing the drying procedure and agglomeration. The PELLI method was used for MnO_2 and Mn_3O_4 particles synthesized in aqueous solutions and extracted using octanohydroxamic acid (OHA) into an n-butanol phase for the fabrication of composite MnO_2-MWCNT and Mn_3O_4-MWCNT electrodes for electrochemical supercapacitors. OHA allowed for two extraction mechanisms due to its solubility in an alkaline solution which allows it to be used as a capping agent as well as an extractor. The novel strategies permitted agglomerate free fabrication of advanced ES electrodes resulting in an exceptional capacitance for the Mn_3O_4-MWCNT electrode of 4.2Fcm^{-2} at a scan rate of 2mV/s. The two electrodes prepared using OHA as an extracting agent for the PELLI method are very promising for the future of agglomerate free materials for ES. OHA can be used in other applications that entail strong adsorption on particles at the water-n-butanol interface as well as in the bulk of an aqueous phase.

Biography

Jordan Milne completed his undergraduate degree in Materials Science and Engineering at McMaster University. He is currently doing his Master in Applied Science at McMaster university focusing on energy storage devices, specifically, supercapacitors. He has published 3 papers and is considering transferring to PhD.

milneji@mcmaster.ca

Notes: