ET-P006

Single Crystalline β-Na0.33V2O5 Nanowires Based Supercapacitor

Nguyen Thi Hong Trang, Imran Shakir, Dae Joon Kang

BK21 Physics Research Division, Institute of Basic Sciences,
Department of Energy Science, Sungkyunkwan University, Suwon 440-746, Korea

Supercapacitors, which can deliver significant energy with high power density, have attracted a lot of attention due to their potential application in energy storage. Among various oxide materials, sodium vanadate has been recognized as one of the most promising electrode materials because of high electrical conductivity. In addition, larger layer spacing of β-Na0.33V2O5 compared to V2O5 makes easier Li+ insertion. Moreover, β-Na0.33V2O5 has a tunnel like structure along b axis with 3 kinds of V site allowing it to enhance the ion intercalation by introducing three different intercalation sites along the tunnel. The tunnel can act as a fast diffusion path for ion diffusion, which can improve the overall charge storage kinetics. In this study, high quality single crystalline sodium vanadate (β-Na0.33V2O5) nanowires were grown directly on Pt coated SiO_2 substrate by a facile chemical solution deposition method without employing catalyst, surfactant or carrier gas. The results show that great enhancement in capacitance was observed compared with previous reports.

Keywords: Beta-sodium niobate, Supercapacitor