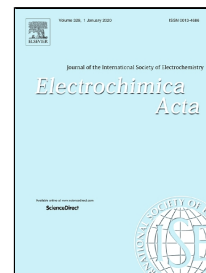


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PII: S0013-4686(19)32252-2
DOI: <https://doi.org/10.1016/j.electacta.2019.135380>
Reference: EA 135380

To appear in: *Electrochimica Acta*

Received Date: 20 September 2019

Accepted Date: 25 November 2019

Please cite this article as: Xiao-Hang Ma, Long Cheng, Le-Le Li, Xian Cao, Yuan-Yuan Ye, Yi-yong Wei, Yao-dong Wu, Mao-Lin Sha, Zhen-Fa Zi, Jian-Ming Dai, Influence of cut-off voltage on the lithium storage performance of $\text{Nb}_{12}\text{W}_{11}\text{O}_{63}$ anode, *Electrochimica Acta* (2019), <https://doi.org/10.1016/j.electacta.2019.135380>

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Influence of cut-off voltage on the lithium storage performance of $\text{Nb}_{12}\text{W}_{11}\text{O}_{63}$ anode

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ABSTRACT:

The niobium tungsten oxide $\text{Nb}_{12}\text{W}_{11}\text{O}_{63}$ is synthesized by a simple solid-state method and studied as an anode for lithium-ion batteries. By comparing with graphite anode, $\text{Nb}_{12}\text{W}_{11}\text{O}_{63}$ with orthorhombic structure has higher safe working voltage (>1.70 V) and tap density (~ 2.57 g cm^{-3}). The effect of cut-off voltage on the electrochemical property is also analyzed in detail. X-ray diffraction results reveal the mechanism of performance deterioration in $\text{Nb}_{12}\text{W}_{11}\text{O}_{63}$ under deep discharge, which is caused by the collapse of crystal structure due to the transformation of pentagonal bipyramid to octahedron induced by excessive Nb^{3+} . At the cut-off voltage of 1.3 V, $\text{Nb}_{12}\text{W}_{11}\text{O}_{63}$ electrode delivers excellent electrochemical performances with high initial coulombic efficiency of 94.7 %, improved cycling stability of 146 mAh g^{-1}

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