

Accepted Manuscript

High performance proton-conducting composite based on vanadium-substituted Dawson-type heteropoly acid for proton exchange membranes

Han Wu, Xuefei Wu, Qingyin Wu, Wenfu Yan



PII: S0266-3538(17)33004-X

DOI: [10.1016/j.compscitech.2018.04.018](https://doi.org/10.1016/j.compscitech.2018.04.018)

Reference: CSTE 7180

To appear in: *Composites Science and Technology*

Received Date: 25 November 2017

Revised Date: 16 March 2018

Accepted Date: 12 April 2018

Please cite this article as: Wu H, Wu X, Wu Q, Yan W, High performance proton-conducting composite based on vanadium-substituted Dawson-type heteropoly acid for proton exchange membranes, *Composites Science and Technology* (2018), doi: 10.1016/j.compscitech.2018.04.018.

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

High performance proton-conducting composite based on vanadium-substituted Dawson-type heteropoly acid for proton exchange membranes

Han Wu^a, Xuefei Wu^a, Qingyin Wu^{a,*}, Wenfu Yan^b,

^a Department of Chemistry, Zhejiang University, Hangzhou 310027, P.R. China

^b State Key Laboratory of Inorganic Synthesis and Preparative Chemistry, College of Chemistry, Jilin University, Changchun 130012, P.R. China

Abstract: Proton exchange membranes (PEMs) are the key parts in proton exchange membrane fuel cells (PEMFCs). In this work, a proton-conducting composite membrane rGO-P₂W₁₆V₂@SPEEK was synthesized from vanadium-substituted Dawson-type heteropoly acid (H₈P₂W₁₆V₂O₆₂•20H₂O, abbreviated as P₂W₁₆V₂), sulfonated polyether ether ketone (SPEEK) and reduced graphene oxide (rGO). Characterizations proved the integrity of the Dawson-structure heteropoly acids (HPAs) in composites and the uniform inorganic-organic hybrid distribution. The membrane shows excellent proton conductivity of $7.90 \times 10^{-2} \text{ S} \cdot \text{cm}^{-1}$ at 50°C and the proton conduction was proved to comply with the Grotthuss mechanism. Up to now, this is the first time that a Dawson-type HPA was reported for the application of PEMs and this work extended the application of polyoxometalate-based materials in the field of fuel cells.

Keywords: Heteropoly acid; Proton exchange membrane; Graphene; Polymer-matrix composites (PMCs); Electrical properties;

* Corresponding author. Tel.: +86 571 87951895; fax: +86 571 87951895.
E-mail address: qywu@zju.edu.cn

Download English Version:

<https://daneshyari.com/en/article/7214354>

Download Persian Version:

<https://daneshyari.com/article/7214354>

[Daneshyari.com](https://daneshyari.com)