

## Accepted Manuscript

Title: Amino acids modified konjac glucomannan as green corrosion inhibitors for mild steel in HCl solution

Authors: Kegui Zhang, Wenzhong Yang, Xiaoshuang Yin, Yun Chen, Ying Liu, Jinxun Le, Bin Xu



PII: S0144-8617(17)31225-0  
DOI: <https://doi.org/10.1016/j.carbpol.2017.10.069>  
Reference: CARP 12918

To appear in:

Received date: 11-8-2017  
Revised date: 16-9-2017  
Accepted date: 21-10-2017

Please cite this article as: Zhang, Kegui., Yang, Wenzhong., Yin, Xiaoshuang., Chen, Yun., Liu, Ying., Le, Jinxun., & Xu, Bin., Amino acids modified konjac glucomannan as green corrosion inhibitors for mild steel in HCl solution. *Carbohydrate Polymers* <https://doi.org/10.1016/j.carbpol.2017.10.069>

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.

# Amino acids modified konjac glucomannan as green corrosion inhibitors for mild steel in HCl solution

Kegui Zhang,<sup>a</sup> Wenzhong Yang,<sup>a,\*</sup> [yangwz@njtech.edu.cn](mailto:yangwz@njtech.edu.cn), Xiaoshuang Yin,<sup>a</sup> Yun Chen,<sup>a</sup> Ying Liu,<sup>a</sup> Jinxun Le,<sup>a</sup> Bin Xu<sup>b</sup>

<sup>a</sup>College of Chemistry and Molecular Engineering, Nanjing Tech University, Nanjing 210009, China

<sup>b</sup>Nanjing Institute of Environmental Sciences, Ministry of Environmental Protection, Nanjing 210042, China

\*Corresponding author.: Telephone: +8625 83172359

## Highlights

- 1. Konjac glucomannan is modified with amino acids to prepare polysaccharide esters.
- 2. Synthetic polymers act as mixed-type inhibitors for steel in hydrochloric acid.
- 3. The adsorption of inhibitor molecules on metal surface follows Langmuir isotherm.
- 4. UV-vis spectra confirm the formation of inhibitor-Fe<sup>2+</sup> complex in HCl solution.

## ABSTRACT

Konjac glucomannan (KGM) was modified with amino acids to synthesize polysaccharide esters (KGMA and KGMH) which were evaluated as corrosion inhibitor for mild steel in 0.5 M HCl solution by weight loss tests, Tafel curves, electrochemical impedance spectroscopy (EIS) and scanning electron microscopy (SEM). The synthetic polymers were found to have the lower water absorbency and the higher water solubility than KGM. Gravimetric measurements showed the maximum efficiencies of KGMA and KGMH for decreasing the corrosion rate of metal at 2000 ppm are up to 89.9% and 92.4%, respectively. Polarization curves indicated polysaccharide esters could retard both hydrogen evolution reaction and metal dissolution reaction and that the inhibitory effect was concentration dependent. Besides, EIS studies demonstrated the corrosion

Download English Version:

<https://daneshyari.com/en/article/7784457>

Download Persian Version:

<https://daneshyari.com/article/7784457>

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