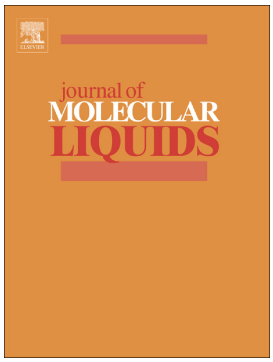
Accepted Manuscript



Base-catalyzed oxidation of sulfated kappa'carrageenan by alkaline hexacyanoferrate(III): A mechanistic approach of electron-transfer process

Refat M. Hassan, Samia M. Ibrahim

PII: S0167-7322(18)34096-0
DOI: doi:10.1016/j.molliq.2018.09.136
Reference: MOLLIQ 9742

To appear in: *Journal of Molecular Liquids*

Received date: 7 August 2018
Revised date: 21 September 2018
Accepted date: 28 September 2018

Please cite this article as: Refat M. Hassan, Samia M. Ibrahim , Base-catalyzed oxidation of sulfated kappa'carrageenan by alkaline hexacyanoferrate(III): A mechanistic approach of electron-transfer process. Molliq (2018), doi:10.1016/j.molliq.2018.09.136

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.

ACCEPTED MANUSCRIPT

Base-catalyzed oxidation of sulfated kappa-carrageenan by alkaline hexacyanoferrate(III): A mechanistic approach of electron-transfer process

Refat M. Hassan[a,*], Samia M. Ibrahim[b]

[a]*Chemistry Department, Faculty of Science, Assiut University, Assiut 71516, Egypt.*
[b]*Chemistry Department, Faculty of Science, New Valley University, El-Kharja 72511, New Valley, Egypt.*

ABSTRACT

The oxidation of kappa-carrageenan (KCAR) as sulfated anionic polyelectrolyte by alkaline hexacyanoferrate(III) has been investigated spectrophotometrically. Pseudo-first-order plots showed complex kinetics where slightly upward curvatures at the initial absorbance changes were appeared, followed by linearity portions for about two-half-lives of reaction completion, and then it deviates from linearity at longer time periods. The oxidation process was found to be of base-catalyzed and free-radical intervention nature. Formation of 1:1 intermediate complex was revealed kinetically. Addition of $[Fe(CN)_6]^{4-}$ to the reaction mixtures was found to inhibit the reaction rates. The activation parameters have been evaluated and a tentative reaction mechanism consistent with the kinetic results is suggested and discussed.

***Keywords*:** Catalysis, Kappa-carrageenan, Hexacyanoferrate(III), Oxidation, Kinetics, Mechanism.

1.Introduction

Redox reactions which involving sulfur-containing compounds such as carrageenan showed a remarkable kinetic complexity [1] which is highlighted by either autocatalysis and / or free-radical intervention.

*Corresponding author. Tel.: +201227319979; fax:+20882342708.
E-mail address: rmhassan2002@yahoo.com (RMHassan)

Download English Version:

https://daneshyari.com/en/article/11262931

Download Persian Version:

https://daneshyari.com/article/11262931

Daneshyari.com