

## Accepted Manuscript

Title: Synthesis and Characterization of grafting polystyrene from guar gum using Atom Transfer Radical Addition

Authors: Yang Yang, Fu Chen, Qi Chen, Jie He, Tao Bu, Xuemei He



PII: S0144-8617(17)30957-8  
DOI: <http://dx.doi.org/10.1016/j.carbpol.2017.08.081>  
Reference: CARP 12688

To appear in:

Received date: 23-7-2017  
Revised date: 18-8-2017  
Accepted date: 18-8-2017

Please cite this article as: Yang, Yang., Chen, Fu., Chen, Qi., He, Jie., Bu, Tao., & He, Xuemei., Synthesis and Characterization of grafting polystyrene from guar gum using Atom Transfer Radical Addition. *Carbohydrate Polymers* <http://dx.doi.org/10.1016/j.carbpol.2017.08.081>

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.

## Synthesis and Characterization of grafting polystyrene from guar gum using Atom Transfer Radical Addition

Yang Yang<sup>a,b</sup>, Fu Chen<sup>a,b,\*</sup>, Qi Chen<sup>a,b</sup>, Jie He<sup>a,b</sup>, Tao Bu<sup>a,b</sup>, Xuemei He<sup>a,b</sup>

<sup>a</sup>College of Chemistry and Chemical Engineering, Southwest Petroleum University, Chengdu, Sichuan 610500, PR of China;

<sup>b</sup>Oil & Gas Field Applied Chemistry Key Laboratory of Sichuan Province, Southwest Petroleum University, Chengdu, Sichuan 610500, P R of China

\*Corresponding author: Fu Chen;

Email: fuchenswpu@126.com.

### High lights

- The modification of fracturing fluid thickener by atom transfer radical addition is relatively few
- This paper simplifies the steps of atom transfer radical addition(not synthesize macromolecular initiator), which is conducive to industrial production
- Compared with the unmodified guar gum, the modified guar gum has obvious thickening ability and thermal stability.

### Abstract

To broaden the application fields for guar gum, this natural polymer is often grafted to/from the surface to modify its properties. Polystyrene-guar gum (PS-guar gum) is successfully synthesized using atom transfer radical addition based n-BuBr(C<sub>4</sub>H<sub>9</sub>Br), Cu(I)Cl and N,N,N',N'',N'''-pentamethyldiethylenetriamine(C<sub>9</sub>H<sub>23</sub>N<sub>3</sub>,PMDETA) as initiator, electronating agent and ligand respectively in an inert atmosphere. The graft copolymer is characterized by FT-IR, <sup>1</sup>H NMR, XRD and scanning electron microscope (SEM).The results show that styrene is successfully introduced onto guar gum and particles of PS-guar gum adopt a disordered morphology with diameters of 100 nm, and PS-guar gum are largely amorphous with poor crystallinity. Besides, add on shows an increasing trend on increasing the concentration of PS. Swelling behavior,

Download English Version:

<https://daneshyari.com/en/article/5156564>

Download Persian Version:

<https://daneshyari.com/article/5156564>

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