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

Xuemei He

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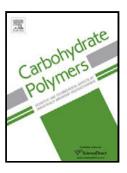
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Synthesis and Characterization of grafting polystyrene from guar gum using Atom Transfer

Radical Addition

Yang Yang^{a,b}, Fu Chen^{a,b,*}, Qi Chen^{a,b}, Jie He^{a,b}, Tao Bu^{a,b}, Xuemei He^{a,b}

^aCollege of Chemistry and Chemical Engineering, Southwest Petroleum University, Chengdu,

Sichuan 610500, PR of China;

^bOil & Gas Field Applied Chemistry Key Laboratory of Sichuan Province, Southwest Petroleum

University, Chengdu, Sichuan 610500, PR 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(C₄H₉Br), Cu(I)Cl and

N,N,N',N",N"-penthamethyldiethylenetriamine(C₉H₂₃N₃,PMDETA) as initiator, electronating

agent and ligand respectively in an inert atmosphere. The graft copolymer is characterized by FT-

IR, ¹H 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,

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