

## Modification of diutan gum to enhance rheological properties for oil and gas application

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### ABSTRACT

A favorable gelling fluid for oil and gas industry is the one that have good rheological, thermally stable properties and environmental friendly. In the present study, a gelling agent, diutan gum (DG) was modified with N-(3-chloro-2-hydroxypropyl) trimethyl ammonium chloride (CHPTAC) to enhance the rheological properties. The modified-diutan gum (MDG) were characterized using Fourier transform infrared spectroscopy (FTIR), scanning electron microscope (SEM) and rheometer. FTIR result shows a significant decreasing of hydroxyl group intensity and the appearance of new peak at  $1250\text{ cm}^{-1}$  attributed to the substitution of CHPTAC on the DG backbone. In addition, the rheological properties of the MDG fluid showed remarkable increases in apparent viscosity. The elastic modulus ( $G'$ ) and viscous modulus ( $G''$ ) also increases showing that the MDG have good viscoelastic properties which due to the strong electrostatic interaction between the chains after the modification. This finding showed that, with simple modification using CHPTAC, the rheological properties of MDG gelling agent can be tailored and expected to increase the thermal properties.

### KEYWORDS

Diutan gum; Fourier transform infrared spectroscopy (FTIR); Rheological properties; Gelling agent

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