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(54) **METHOD FOR PREPARATION OF BIOMIMETIC POLYMER FOR STABILIZING WELLBORE AND DRILLING FLUID**

(71) Applicant: **China University of Petroleum (Beijing)**, Beijing (CN)

(72) Inventors: **Guancheng Jiang**, Beijing (CN); **Yang Xuan**, Beijing (CN); **Xianzhu Wu**, Chengdu (CN); **Junbin Chen**, Chengdu (CN); **Wei Ouyang**, Chengdu (CN); **Taotao Luo**, Chengdu (CN)

(73) Assignee: **China University of Petroleum (Beijing)** (CN)

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(58) **Field of Classification Search**

None

See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

2002/0055560	A1*	5/2002	Nanbu	B01J 13/16 524/21
2013/0034650	A1*	2/2013	Li	A01N 25/28 426/650
2013/0157905	A1*	6/2013	Saini	C09K 8/685 507/212

FOREIGN PATENT DOCUMENTS

CN	10308767690	A	5/2013

OTHER PUBLICATIONS

Yang Xuan, et al., "A biomimetic drilling fluid for wellbore strengthening", Petroleum Exploration and Development, vol. 40, No. 4, pp. 531-536, (Aug. 2013).

Junjie Wu, et al., "Mussel-Inspired Chemistry for Robust and Surface-Modifiable Multilayer Films", Langmuir, vol. 27, pp. 13684-13691, (2011).

Bruce P. Lee, et al., "Synthesis and Gelation of DOPA-Modified Poly(ethylene glycol) Hydrogels", Biomacromolecules, vol. 3, No. 5, pp. 1038-1047, (2002).

* cited by examiner

Primary Examiner — Jeffrey Washville

(74) *Attorney, Agent, or Firm* — Calfee, Halter & Griswold LLP

(57) **ABSTRACT**

The present invention provides a biomimetic polymer for stabilizing wellbore, a method for preparation of the biomimetic polymer, and a drilling fluid. The polymer contains carboxymethyl chitosan that serves as a backbone and dopamine-derived groups grafted on the backbone. The polymer provided in the present invention can improve the strength of shale in the wellbore, seal the shale pores and reduce the filter loss of drilling fluid, and thereby attains an effect of stabilizing the wellbore in shale formation in drilling process.

7 Claims, 2 Drawing Sheets