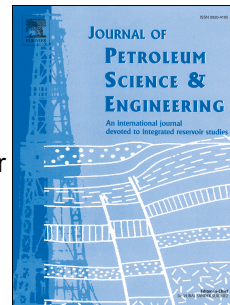


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# An Optimal Degrading Agent Formulation for Detachable Packing Screens Applicable for Screenless Sand Control

Ning Qi<sup>1\*</sup>, Boyang Li<sup>1</sup>, Wenbin Cai<sup>2</sup>, Xiaqing Li<sup>3</sup>, Chengyuan Gao<sup>4</sup>

(1. College of Petroleum Engineering, China University of Petroleum (East China), Qingdao 266580, China;

2. College of Petroleum Engineering, Xi'an Shiyou University, Xi'an 710065, China;

3. Petroleum Engineering Technology Research Institute of Shengli Oilfield Co., SinoPec, Dongying 257000, China;

4. Gudao Oil Production Plant, Shengli Oilfield Co., SinoPec, Dongying, 257231, China)

## Abstract

A new detachable packing screen used for sand control in oilfields has been designed. The key technology is to achieve rapid and effective downhole detachment of PLA-T (a polylactic acid material) tubing. An optimal formulation of the degradation agent was proposed considering the degradation degree and degradation rate of PLA-T materials. The temperature, salt and dilution tolerance of such degradation agent was evaluated under conditions simulating the in-situ reservoir environment. The degradation mechanism of the PLA-T was analyzed through scanning electron microscope (SEM) on the PLA-T surface during the reaction process. It is shown that the optimal formulation is that acetone: dimethylformamide: ethylenediamine ratio equals to 3: 2: 5. Under reservoir conditions with temperatures from 50 °C to 80 °C, water salinities from 10,000 mg/L to 100,000 mg/L and diluted concentrations from 70% to 90% of the original concentration, the degradation time of the PLA-T tubing ranges from 6 min to 92 min. This system maintains its excellent degradation capability under the complex downhole situation. The SEM tests show that the surface structure of the PLA-T changes gradually from the smooth surface, to cracks, then fractures, irregular fractures and finally the fracture-hole structure, and correspondingly the degradation rate of PLA-T first increases and then drops. The proposed high-efficiency degradation agent can achieve effective detachment of the downhole packing screen by rapidly degrading the PLA-T tubing, which enables screenless sand control of the unconsolidated sandstone reservoirs.

**Key words:** detachable packing screen; degradation agent; degradation degree; degradation rate; screenless sand control

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\* Tel: +8615898855079 E-mail: [qining@upc.edu.cn](mailto:qining@upc.edu.cn)

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