

调驱用纳米级聚合物微球

Nano scale polymer microspheres for displacement control

产品概述

【外观】本品外观一般呈淡黄色透明或半透明至乳白色可自由流动的液体。

【物理化学性质】调驱用纳米级聚合物微球是由纳米或微米尺寸的聚合物粒子组成的复合物，可广泛应用于油田深部调驱，产品具有耐高温、抗盐性强、耐油田采出液污水等特点，微球粒径可达纳米级，能够轻易进入低渗透储层的微孔隙，起到深部调剖和驱油效果，产品同时具有延迟膨胀的特性，可以进入地层较深部位。



性能特点

1. 耐高温、抗盐性强；
2. 耐剪切、易注入；
3. 变形能力强、封堵效果好；
4. 具有深部调驱效果、可有效提高采收率；
5. 能够自然降解、减少对环境的危害。

【用法及用量】本产品除自身性质之外，控水、调驱效果与原油性质及地层结构密切相关，使用前需进行试验，确定加入量及使用方案；本产品推荐加量为1000~2000ppm，用调剖泵随注入水注入地层。

技术指标

微球 1.0 指标

项目		指标						
型号		WQ50N	WQ100	WQ300	WQ800			
外观		黄色透明均匀液体，不分层	黄色均匀液体，不分层	淡黄色均匀液体；不分层	乳白色液体，若静止分层，搅拌后可重新分散均匀			
密度 (25°C, g/cm³)		0.920~1.080						
分散性能		在水中完全分散，无絮状物，无凝胶						
可分离固体物		≥22%	≥23%	≥26%				
可分离固体物形态		可分离固体物不成团						
初始粒径	粒径中 (D50), nm	35≤D50<65	80≤D50<130	200≤D50<400	600≤D50<1000			
	最颗粒径的频度, %	≥15	≥13					
粘度 (25°C, mPa·s)		≤300	≤400	≤600	≤1000			
分散液毛细管粘度 (v, 0.2%, 25°C)		1.00≤v≤1.50	≤1.5					
S 元素固含量 (占可分离固体物中) (%)		≥2.5						
凝点, °C		≤-20 (根据冬季现场气温调整)						
闪点, °C		≥60						
粒径膨胀倍数, 倍		3~8						
堵塞率, %		≥82						
老化稳定性, %		≥82						
丙烯酰胺单体含量, %		≤0.04						

微球 2.0 指标

项目	指标
外观	淡黄色透明或半透明液体
密度 (25°C, g/cm³)	0.920~1.080
分散性能	在水中完全分散，无絮状物，无凝胶
可分离固体物含量 (%)	≥22.0
可分离固体物形态	可分离固体物不成团
初始粒径 (D50), nm	80≤D50≤135
原液粘度 (25°C, mPa·s)	≤500
分散液毛细管粘度 (v, 0.2%, 25°C)	≤1.5
S 元素含量 (占可分离固体物中) (%)	≥2.5

产品用途

采油用聚合物驱油剂的用途主要是通过增加注入水的粘度，改善油水流度比，从而提高原油采收率。聚合物驱油剂通常是通过在注入水中加入一定量的高分子聚合物（如聚丙烯酰胺），以增加注入水的粘度，调整吸水剖面，扩大波及体积。聚合物由于其固有的粘弹性，在流动过程中产生对油膜或油滴的拉伸作用，增加了携带力，从而提高微观洗油效率。

【用法及用量】本产品除自身性质之外，控水、调驱效果与原油性质及地层结构密切相关，使用前需进行试验，确定加入量及使用方案；本产品推荐加量为1000~2000ppm，用调剖泵随注入水注入地层。

包装与贮存

【包装】本产品一般用铁桶或塑料桶包装，可分净重1000kg、吨桶和净重200kg、25kg的不同规格桶，也可根据客户要求定制包装，运输过程中应轻装轻卸、避免碰撞、切勿倒置。

【存储条件】本产品应储存于干燥、阴凉、通风的库房，远离火种和热源。

【保质期】1年。



Product Overview

[Appearance] This product generally appears as a light yellow transparent or semi transparent to milky white liquid that can flow freely.

【Physical and Chemical Properties】 Nanoscale polymer microspheres for oil field control and drive are composite materials composed of polymer particles with nanometer or micrometer sizes, which can be widely used in deep oil field control and drive. The product has the characteristics of high temperature resistance, strong salt resistance, and resistance to oilfield produced liquid and sewage. The microsphere particle size can reach the nanometer level and can easily enter the micropores of low-permeability reservoirs, playing a role in deep profile control and oil drive. The product also has the characteristic of delayed expansion and can enter deeper parts of the formation.

Characteristics

1. Strong resistance to high temperature and salt;
2. Resistant to shear and easy to inject;
3. Strong deformation ability and good sealing effect;
4. Has deep water flooding effect and can effectively improve oil recovery rate;
5. Can naturally degrade and reduce harm to the environment.

【Usage and Dosage】 In addition to its own properties, the water control and displacement effects of this product are closely related to the properties of the crude oil and the formation structure. Before use, experiments should be conducted to determine the dosage and usage plan; The recommended dosage for this product is 1000-2000ppm, and it is injected into the formation along with the injected water using a profile control pump.

Technical Specification

Microsphere 1.0 Index

project	index						
model	WQ50N	WQ100	WQ300	WQ800			
appearance	Yellow transparent uniform liquid, without layering	Yellow uniform liquid, without layering	Light yellow uniform liquid; Non layered	Milky white liquid, if still and layered, can be dispersed evenly after stirring			
Density (25 °C, g/cm³)		0.920~1.080					
Dispersion performance		Completely dispersed in water, without flocs and gel					
Separable solids		≥22%	≥23%	≥26%			
Separable solid form		Separable solids do not form clusters					
Initial particle	Medium particle size (D50), nm	35≤D50<65	80≤D50<130	200≤D50<400			
	The frequency of the size most frequent particle size, %	≥15	≥13				
Viscosity (25 °C, mPa·s)	≤300	≤400	≤600	≤1000			
Dispersion capillary viscosity (v, 0.2%, 25 °C)	1.00≤v≤1.50	≤1.5					
S element solid content (%) of separable solids)	≥2.5						
Condensation point, °C	≤-20 (adjusted according to winter on-site temperature)						
Flash point, °C	≥60						
Expansion ratio of particle size, times	3~8						
Blockage rate, %	≥82						
Aging stability, %	≥82						
Acrylamide monomer content, %	≤0.04						

Microsphere 2.0 Index

project	index
appearance	Light yellow transparent or semi transparent liquid
Density (25 °C, g/cm³)	0.920~1.080
Dispersion performance	Completely dispersed in water, without flocs and gel
Separable solid content (%)	≥22.0
Separable solid form	Separable solids do not form clusters
Initial particle size (D50), nm	80≤D50≤135
The viscosity of the original solution (25 °C, mPa.s)	≤500
Dispersion capillary viscosity (v, 0.2%, 25 °C)	≤1.5
S element content (% of separable solids)	≥2.5

Applications

The main use of polymer oil displacement agents for oil extraction is to increase the viscosity of injected water, improve the oil-water flow ratio, and thus increase crude oil recovery. Polymer oil displacement agents usually increase the viscosity of injected water, adjust the water absorption profile, and expand the swept volume by adding a certain amount of polymer (such as polyacrylamide) to the injected water. Polymers, due to their inherent viscoelasticity, exert a stretching effect on oil films or droplets during the flow process, increasing the carrying force and thus improving the microscopic oil washing efficiency.

【Usage and Dosage】 In addition to its own properties, the water control and displacement effects of this product are closely related to the properties of the crude oil and the formation structure. Before use, experiments should be conducted to determine the dosage and usage plan; The recommended dosage for this product is 1000-2000ppm, and it is injected into the formation along with the injected water using a profile control pump.

Package and Storage

[Packaging] This product is generally packaged in iron or plastic drums, and can be divided into different specifications of drums with a net weight of 1000kg, 200kg, and 25kg. Packaging can also be customized according to customer requirements. During transportation, it should be loaded and unloaded gently, avoid collisions, and do not invert.

[Storage Conditions] This product should be stored in a dry, cool, and ventilated warehouse, away from sources of fire and heat.

Shelf life: 1 year.



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