

INFORME DE BÚSQUEDA DE PATENTES PARA EL No de Radicación: 14-145545						
CRITERIOS PARA LA BÚSQUEDA (anexar pantallazo o reporte en PDF, junto con los booleanos utilizados)						
Palabras clave utilizadas		Methods, fracturing a subterranean, ultra lightweight proppants, suspensions and gaseous streams.				
CLASIFICACIONES INTERNACIONALES UTILIZADAS PARA LA BÚSQUEDA		C09K8/70; C09K8/80.				
BASES DE DATOS CONSULTADAS.						
ESPAENET		Patentscope		Patbase		Espatentes
USPTO		Sciencedirect				
INFORMES DE EXÁMENES REALIZADOS EN OTRAS OFICINAS (documentos patentes, literatura no patente etc...)						
Oficina	Fecha del examen o de reporte de búsqueda de documentos	Anterioridades encontradas para el examen o reportados en el examen de búsqueda(relacionarlos todos)	Reiv. afectadas	RELEVANCIA (requisito que afecta)	FUERON TENIDOS EN CUENTA PARA EL EXAMEN EN LA OFICINA COLOMBIANA	
					SI	NO
WIPO	23/04/2013	Data interface assembly for electronic locks and readers US2007087941	13-18. 22-24. 26/ 1-12, 19-21, 25	Novedad / Nivel inventivo		X
		"High-qualityfoam fracturing fluids", Phillip C. Harris, ET.	1-12, 19-21, 25	Nivel inventivo		X
		Methods of fracturing a subterranean formation using a pH dependent foamed fracturing fluid US2005077047	1-26	A		X
		Downhole foam generator US4730676	1-26	A		X
		Coarse-foamed fracturing fluids and associated methods US2007044965	1-26	A		X
		Method of enhancing hydraulic fracturing using ultra lightweight proppants US2006065398	1-26	A		X
DOCUMENTOS ADICIONALES ENCONTRADOS POR EL EXAMINADOR DE ACUERDO A LOS CRITERIOS DE BÚSQUEDA.						
Method of treating subterranean formations with porous ceramic particulate materials US2004040708						
Viscoelastic surfactant based foam fluids US5258137						
Method of treatment subterranean formations using multiple proppant stages or mixed proppants US7210528						
Method of fracturing using ultra lightweight proppant suspensions and gaseous streams US7913762						
Use of Carbon-Dioxide-Based Fracturing Fluids US7726404						
Method for stimulation of wells with carbon dioxide or nitrogen based fluids containing high proppant concentrations US4627495						
Method for fracturing subterranean formations US6875728						
Composition and method for producing an ultra-lightweight ceramic proppant WO2011014410						

Lightweight proppants and their use in hydraulic fracturing US5531274

Methods and compositions of a storable relatively lightweight proppant slurry for hydraulic fracturing and gravel packing applications US2005028979

Microporous diffusion apparatus US5855775

Foam sweep in fractures for enhanced oil recovery Journal Colloids and surfaces

Observaciones

Fecha del reporte de búsqueda: 22/12/2015

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Bibliographic data: US2004040708 (A1) — 2004-03-04

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Method of treating subterranean formations with porous ceramic particulate materials

Page bookmark US2004040708 (A1) - Method of treating subterranean formations with porous ceramic particulate materials

Inventor(s): STEPHENSON CHRISTOPHER JOHN [US]; RICKARDS ALLAN RAY [US]; BRANNON HAROLD DEAN [US]; GUPTA D V SATYANARAYANA [US] ±

Applicant(s): STEPHENSON CHRISTOPHER JOHN; RICKARDS ALLAN RAY; BRANNON HAROLD DEAN; GUPTA D V SATYANARAYANA; BJ SERVICES COMPANY

Classification: - International: C09K8/00; E21B43/267; (IPC1-7): E21B43/04
- cooperative: C09K8/00; E21B43/267; Y10T428/2982; Y10T428/2991; Y10T428/2993; Y10T428/2995; Y10T428/2996; Y10T428/2998

Application number: US20030653521 20030902

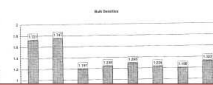
Priority number(s): US20030653521 20030902; US20020407734P 20020903; US20020428836P 20021126

Also published as: US7426961 (B2); US7426961 (X6); US2010222243 (A1); US7968907 (B2); US2004200617 (A1); → more

Abstract of US2004040708 (A1)

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[Spanish] [patenttranslate] powered by EPO and Google

Methods and compositions useful for subterranean formation treatments, such as hydraulic fracturing treatments and sand control that include porous materials. Such porous materials may be selectively configured porous material particles manufactured and/or treated with selected glazing materials, coating materials and/or penetrating materials to have desired strength and/or apparent density to fit particular downhole conditions for well treating such as hydraulic fracturing treatments and sand control treatments. Porous materials may also be employed



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Bibliographic data: US5258137 (A) — 1993-11-02

In my patents list EP Register Report data error Print

Viscoelastic surfactant based foam fluids

Page bookmark US5258137 (A) - Viscoelastic surfactant based foam fluids

Inventor(s): BONEKAMP JEFFREY E [US]; ROSE GENE D [US]; SCHMIDT DONALD L [US]; TEOT ARTHUR S [US]; WATKINS EDWARD K [US] ±

Applicant(s): DOW CHEMICAL CO [US] ±

Classification: - International: A62D1/02; A62D1/04; B01F1/00; C09K8/70; (IPC1-7): A62D1/04; B01F1/02; B01F1/18; B01F1/30
- cooperative: A62D1/0071; A62D1/0085; B01F1/0042; B01F1/0057; C09K8/70; C09K2208/30; Y10S26/126; Y10S51/004

Application number: US19920848502 19920309

Priority number(s): US19920848502 19920309; CA19922148583 19921104; US19880199486 19880527; US19840885530 19841224; WO1992V089484 19921104

Also published as: EP0669844 (A1); EP0669844 (A4); EP0669844 (B1); CA2148583 (A1); CA2148583 (C); → more

Abstract of US5258137 (A)

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[Spanish] [patenttranslate] powered by EPO and Google

A foam-fluid composition for use in foam fracture applications and foam slurry transport comprises a thickening amount of a viscoelastic surfactant composition, a functionally effective amount of a surfactant composition capable of forming a foam, and an aqueous liquid. Foam-fluid formulations are easily prepared, reusable, shear stable, easily pumped and form stable foams over a wide temperature range and exhibit high viscosities even at relatively high temperatures.

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22/12/2015



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Bibliographic data: US7726404 (B2) — 2010-06-01

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Use of Carbon-Dioxide-Based Fracturing Fluids

Page bookmark US7726404 (B2) - Use of Carbon-Dioxide-Based Fracturing Fluids

Inventor(s): KUBALA GREGORY [US]; MACKAY BRUCE A [US] ±

Applicant(s): SCHLUMBERGER TECHNOLOGY CORP [US] ±

Classification: - international: E21B43/26; E21B43/27
- cooperative: E21B43/26

Application number: US20080104187 20080416

Priority number(s): US20080104187 20080416

Also published as: US2009260926 (A1)

Abstract of US7726404 (B2)

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A method of treating a shale-containing subterranean formation penetrated by a wellbore is accomplished by forming a carbon dioxide treatment fluid having a viscosity of less than about 10 mPa-s at a shear rate of about 100 s-1. The carbon dioxide treatment fluid is introduced into the formation through the wellbore at a pressure above the fracture pressure of the formation. In certain embodiments, the treatment fluid may be comprised of from about 90% to 100% by weight carbon dioxide and may contain a proppant. A method of treating hydrocarbon-bearing, shale-containing subterranean formation penetrated by a wellbore may also be carried out by forming a carbon dioxide treatment fluid and introducing the carbon dioxide treatment fluid into the formation through the wellbore at a pressure above the fracture pressure of the formation. The formation being treated may have a permeability of less than 1 mD.

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Bibliographic data: US4627495 (A) — 1986-12-09

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Method for stimulation of wells with carbon dioxide or nitrogen based fluids containing high proppant concentrations

Page bookmark US4627495 (A) - Method for stimulation of wells with carbon dioxide or nitrogen based fluids containing high proppant concentrations

Inventor(s): HARRIS PHILLIP C [US]; REIDENBACH VINCENT G [US]; CHISHOLM PAT T [US] ±

Applicant(s): HALLIBURTON CO [US] ±

Classification: - international: E21B43/26; E21B43/267; (IPC1-7): E21B43/267
- cooperative: E21B43/26; E21B43/267

Application number: US19850719669 19850404

Priority number(s): US19850719669 19850404

Also published as: CA1242389 (A)

Abstract of US4627495 (A)

Translate this text into [1] Spanish patenttranslate powered by EPO and Google

The present invention relates to a method of fracturing subterranean formations and placing proppant material in the created fracture utilizing carbon dioxide or nitrogen containing fluid. An aqueous liquid-liquid carbon dioxide emulsion fluid is prepared having an internal phase ratio in the range of from about 50 to in excess of about 95 percent and introduced into the subterranean formation to be fractured. The emulsion is heated by the formation to a temperature above the critical temperature of carbon dioxide and the carbon dioxide is caused to be converted to a vapor whereupon the emulsion becomes a foam. The volume of liquid carbon dioxide is adjusted as the volume of proppant material varies to at least substantially maintain a constant internal phase ratio in the treatment fluid. When nitrogen is utilized, a foam is produced on the surface by admixing gaseous nitrogen with the gelled fluid. The formation is fractured by the treatment fluid and the proppant is placed in the created fracture. The fluid having maintained therein substantially a constant internal phase ratio is capable of

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Bibliographic data: US6875728 (B2) — 2005-04-05

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Method for fracturing subterranean formations

Page bookmark [US6875728 \(B2\) - Method for fracturing subterranean formations](#)

Inventor(s): GUPTA D V SATYANARAYANA [CA]; TUDOR ERIC HUGHSON [CA] ±

Applicant(s): BJ SERVICES COMPANY CANADA [CA] ±

Classification: - international: C09K8/62; (IPC1-7): E21B43/26
- cooperative: C09K8/62; Y10S507/922

Application number: US20010984584 20011030

Priority number(s): US20010984584 20011030; US19990474164 19991228; US19990474149 19991228

Also published as: US2003008781 (A1)

Abstract of US6875728 (B2)

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A method of fracturing a formation with a fracturing fluid wherein the formation has particulate material that swells or migrates upon exposure to the fracturing fluid comprises preparing a fracturing fluid comprising (1) a thickening compound comprising a first surfactant selected from the group consisting of a cationic surfactant having only a single cationic group, an amphoteric surfactant and a mixture thereof, and an anionic surfactant and, (2) water, wherein no or essentially no inorganic salt is added to the fracturing fluid; and using the fracturing fluid to fracture the formation. A method for recycling a fracturing fluid is also provided.

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Bibliographic data: WO2011014410 (A1) — 2011-02-03

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COMPOSITION AND METHOD FOR PRODUCING AN ULTRA-LIGHTWEIGHT CERAMIC PROPPANT

Page bookmark [WO2011014410 \(A1\) - COMPOSITION AND METHOD FOR PRODUCING AN ULTRA-LIGHTWEIGHT CERAMIC PROPPANT](#)

Inventor(s): LI YING [US]; HUANG ZHUIE [US]; LIN SHENGMING [CN]; WU WENZHONG [CN] ±

Applicant(s): PROP SUPPLY AND SERVICE LLC [US]; LI YING [US]; HUANG ZHUIE [US]; LIN SHENGMING [CN]; WU WENZHONG [CN] ±

Classification: - international: E21B43/267
- cooperative: C04B33/13; C04B33/24; C04B35/2695; C04B38/009; C09K8/865; C09K8/80; E21B43/267; C04B2235/0201; C04B2235/0206; C04B2235/0208; C04B2235/0233; C04B2235/0272; C04B2235/0238; C04B2235/0236; C04B2235/0427; C04B2235/077; C04B2235/0692; E21B43/267 + more

Application number: WO2010US42980 20100723

Priority number(s): CN20101157346 20100427; US20090228562P 20090725

Also published as: US2014216741 (A1); US2012118574 (A1); US8727003 (B2); RU2014148285 (A); RU2011153515 (A) + more

Abstract of WO2011014410 (A1)

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An ultra-lightweight, high strength ceramic proppant made from mixture of naturally occurring clays, preferably porcelain clay, kaolin and/or flint clay, earthenware clay or other naturally occurring clays having an alumina content between about 5.5% and about 35%. The proppant has an apparent specific gravity from about 2.10 to about 2.55 g/cc, and a bulk density of from about 1.30 to about 1.50 g/cc. This ultra-lightweight proppant is useful in hydraulic fracturing of oil and gas wells, and has greater conductivity than sand at pressures up to 8,000 psi.

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Bibliographic data: **US5531274 (A)** — 1996-07-02

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Lightweight proppants and their use in hydraulic fracturing

Page bookmark [US5531274 \(A\)](#) - Lightweight proppants and their use in hydraulic fracturing

Inventor(s): BIENVENU JR RAYMOND L [US] ±

Applicant(s): BIENVENU JR, RAYMOND L

Classification: - international: [C09K8/62](#); [C09K8/80](#); [E21B43/267](#); (IPC1-7): [E21B43/267](#)
- cooperative: [C09K8/62](#); [C09K8/80](#); [E21B43/267](#)

Application number: US19940282905 19940729

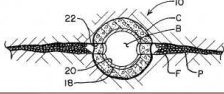
Priority number(s): US19940282905 19940729

Also published as: [W09604464 \(A1\)](#) → [AU3242195 \(A\)](#)

Abstract of **US5531274 (A)**

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The present invention relates to a high strength proppant having a specific gravity of less than 1.3 that can be used in hydraulic fracturing operations of oil and gas wells.



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Bibliographic data: **US5855775 (A)** — 1999-01-05

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Microporous diffusion apparatus

Page bookmark [US5855775 \(A\)](#) - Microporous diffusion apparatus

Inventor(s): KERFOOT WILLIAM B [US] ±

Applicant(s): KERFOOT, WILLIAM B

Classification: - international: [B01F3/04](#); [B09C1/00](#); [B09C1/08](#); [B09C1/10](#); [C02F3/22](#); [E21B43/00](#); (IPC1-7): [B09B3/00](#)
- cooperative: [B01F3/04262](#); [B09C1/00](#); [B09C1/002](#); [B09C1/08](#); [B09C1/10](#); [C02F1/78](#); [C02F3/226](#); [E21B43/00](#); [B01F2003/04319](#); [B01F2003/04858](#); [B01F2003/04886](#); [B01F215/00057](#); [B09C210/100](#); [C02F210/008](#); [Y02C01/0016](#); [Y1082/10098](#); [Y1082/10099](#)

Application number: US19960756273 19961125

Priority number(s): US19960756273 19961125; US19950028499F 19950505; US19960638017 19960425

Also published as: [US2000050549 \(A1\)](#) [US7645380 \(B2\)](#) [US2007023361 \(A1\)](#) [US7637706 \(B2\)](#) [US2002134733 \(A1\)](#) → [more](#)

Abstract of **US5855775 (A)**

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Apparatus for active in situ multi-element gas sparging for bioremediation or physico-chemical degradation for removal of contaminants in a soil formation containing a subsurface groundwater aquifer or a substantially wet unsaturated zone, the multi-gas contained in bubbles, wherein the apparatus includes a plurality of injection wells extending to a depth of a selected aquifer, introducing an oxidizing agent comprising ozone mixed with ambient air to provide a multi-element gas by means of microporous diffusers, without applying a vacuum for



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Foam_Fractures.pdf1 / 12

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COLLOIDS AND SURFACES A

Foam sweep in fractures for enhanced oil recovery

Wei Yan, Clarence A. Miller, George J. Hirasaki*

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Received 29 October 2005; received in revised form 23 February 2006; accepted 24 February 2006

Available online 18 April 2006

Dedicated to Professor Ivan B. Ivanov (LCPE, University of Sofia) on the occasion of his 70th birthday.

Abstract

A theory for foam flow in a uniform fracture was developed and verified by experiment. The apparent viscosity was found to be the sum of contributions arising from liquid between bubbles and the resistance to deformation of the interfaces of bubbles passing through the fracture. Apparent viscosity increases with gas fractional flow and is greater for thicker fractures (for a given bubble size), indicating that foam can divert flow from thicker to thinner fractures. This diversion effect was confirmed experimentally and modeled using the above theory for each individual fracture. The amount of surfactant solution required to sweep a heterogeneous fracture system decreases greatly with increasing gas fractional flow owing to the diversion effect and to the need for less liquid to occupy a given volume when foam is used.

Keywords: Foam; Bubbles; Fractures; Homogeneous; Heterogeneous; Apparent viscosity; Sweep

1. Introduction

Foam in porous media is a dispersed gaseous phase within a continuous aqueous phase comprised mainly of thin films known as lamellae. The lamellae are stabilized by adsorption of surfactant at the gas/liquid interfaces [1].

Because foam has an effective viscosity much higher than that of gas, it has been investigated as a method for improving sweep efficiency in processes where gases such as steam

surfactant is already used in the basic process, so that additional chemical costs are low. One laboratory study of the possible use of foam in such processes for oil recovery and one successful field test by alkaline/surfactant/polymer/foam flooding have been reported [2,3]. Foam was used successfully a few years ago to improve sweep efficiency in a field test of a surfactant process for removing a chlorinated solvent from a sandy ground water aquifer [4]. Subsequently, the process was applied successfully to the remaining contaminated

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