

Title (en)  
ENHANCING THERMAL CONDUCTIVITY OF FLUIDS WITH GRAPHITE NANOPARTICLES AND CARBON NANOTUBE

Title (de)  
VERBESSERUNG DER WÄRMELEITFÄHIGKEIT VON FLUIDEN MIT GRAPHIT-NANOTEILCHEN UND KOHLENSTOFF-NANORÖHREN

Title (fr)  
AMELIORATION DE LA CONDUCTIVITE THERMIQUE DES FLUIDES AVEC DES NANOPARTICULES GRAPHITEES ET DES NANOTUBES DE CARBONE

Publication  
**EP 1509585 A4 20080409 (EN)**

Application  
**EP 02775689 A 20020530**

Priority  
US 0216888 W 20020530

Abstract (en)  
[origin: WO03106600A1] Fluid compositions that have enhanced thermal conductivity, up to 250% greater than their conventional analogues, and methods of preparation for these fluids are identified. The compositions contain at a minimum, a fluid media such as oil or water, and a selected effective amount of carbon nanomaterials necessary to enhance the thermal conductivity of the fluid. One of the preferred carbon nanomaterials is a high thermal conductivity graphite, exceeding that of the neat fluid to be dispersed therein in thermal conductivity, and ground, milled, or naturally prepared with mean particle size less than 500 nm, and preferably less than 200nm, and most preferably less than 100nm. The graphite is dispersed in the fluid by one or more of various methods, including ultrasonication, milling, and chemical dispersion. Carbon nanotube with graphitic structure is another preferred source of carbon nanomaterial, although other carbon nanomaterials are acceptable. To confer long term stability, the use of one or more chemical dispersants is preferred. The thermal conductivity enhancement, compared to the fluid without carbon nanomaterial, is somehow proportional to the amount of carbon nanomaterials (carbon nanotubes and/or graphite) added.

IPC 1-7  
**C10M 141/00**; **C10M 125/02**; **C10M 171/06**

IPC 8 full level  
**C10M 125/02** (2006.01); **C10M 141/00** (2006.01); **C10M 171/06** (2006.01)

CPC (source: EP US)  
**B82Y 30/00** (2013.01 - EP); **B82Y 40/00** (2013.01 - EP); **C01B 32/174** (2017.07 - EP); **C01B 32/21** (2017.07 - EP US); **C10M 125/02** (2013.01 - EP); **C10M 141/00** (2013.01 - EP); **C10M 171/06** (2013.01 - EP US); **C01B 2202/24** (2013.01 - EP); **C01B 2202/28** (2013.01 - EP); **C01B 2202/34** (2013.01 - EP); **C01B 2202/36** (2013.01 - EP); **C01B 2204/24** (2013.01 - EP); **C01B 2204/28** (2013.01 - EP); **C01P 2004/62** (2013.01 - EP); **C01P 2004/64** (2013.01 - EP); **C10M 2201/02** (2013.01 - EP); **C10M 2201/041** (2013.01 - EP); **C10M 2203/065** (2013.01 - EP); **C10M 2203/1065** (2013.01 - EP); **C10M 2205/022** (2013.01 - EP); **C10M 2205/0245** (2013.01 - EP); **C10M 2205/0265** (2013.01 - EP); **C10M 2205/028** (2013.01 - EP); **C10M 2205/0285** (2013.01 - EP); **C10M 2205/04** (2013.01 - EP); **C10M 2205/223** (2013.01 - EP); **C10M 2207/0215** (2013.01 - EP); **C10M 2207/0225** (2013.01 - EP); **C10M 2207/024** (2013.01 - EP); **C10M 2207/103** (2013.01 - EP); **C10M 2207/2805** (2013.01 - EP); **C10M 2207/2825** (2013.01 - EP); **C10M 2209/062** (2013.01 - EP); **C10M 2209/084** (2013.01 - EP); **C10M 2209/104** (2013.01 - EP); **C10M 2209/1045** (2013.01 - EP); **C10M 2209/108** (2013.01 - EP); **C10M 2209/1085** (2013.01 - EP); **C10M 2215/28** (2013.01 - EP); **C10M 2217/023** (2013.01 - EP); **C10M 2217/028** (2013.01 - EP); **C10M 2217/043** (2013.01 - EP); **C10M 2217/044** (2013.01 - EP); **C10M 2223/02** (2013.01 - EP); **C10M 2223/06** (2013.01 - EP); **C10N 2020/02** (2013.01 - EP); **C10N 2050/015** (2020.05 - EP); **C10N 2050/10** (2013.01 - EP)

Citation (search report)  
• [X] US 4915856 A 19900410 - JAMISON WARREN E [US]  
• [E] WO 03050332 A1 20030619 - ASHLAND INC [US], et al & MAKING FUNCTIONAL MATERIALS WITH NANOTUBES. SYMPOSIUM 26-29 NOV. 2001 BOSTON, MA, USA, November 2001 (2001-11-01), Making Functional Materials with Nanotubes. Symposium (Materials Research Society Symposium Proceedings Vol.706) Mater. Res. Soc Warrendale, PA, USA, pages 323 - 328, XP001205807, ISBN: 1-55899-642-7  
• [XA] RIGGS JASON E ET AL: "Optical limiting properties of suspended and solubilized carbon nanotubes", JOURNAL OF PHYSICAL CHEMISTRY. B, MATERIALS, SURFACES, INTERFACES AND BIOPHYSICAL, WASHINGTON, DC, US, vol. 104, no. 30, August 2000 (2000-08-01), pages 7071 - 7076, XP002207176, ISSN: 1089-5647  
• [A] DATABASE INSPEC [online] THE INSTITUTION OF ELECTRICAL ENGINEERS, STEVENAGE, GB; 2002, BRATCHER M ET AL: "Study in the dispersion of carbon nanotubes", XP002469128, Database accession no. 7447574  
• See references of WO 03106600A1

Cited by  
CN114799156A; US7520951B1

Designated contracting state (EPC)  
AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU MC NL PT SE TR

DOCDB simple family (publication)  
**WO 03106600 A1 20031224**; AU 2002341540 A1 20031231; CA 2487340 A1 20031224; CN 100572512 C 20091223; CN 1639310 A 20050713; EP 1509585 A1 20050302; EP 1509585 A4 20080409; MX PA04011927 A 20050331

DOCDB simple family (application)  
**US 0216888 W 20020530**; AU 2002341540 A 20020530; CA 2487340 A 20020530; CN 02829398 A 20020530; EP 02775689 A 20020530; MX PA04011927 A 20020530