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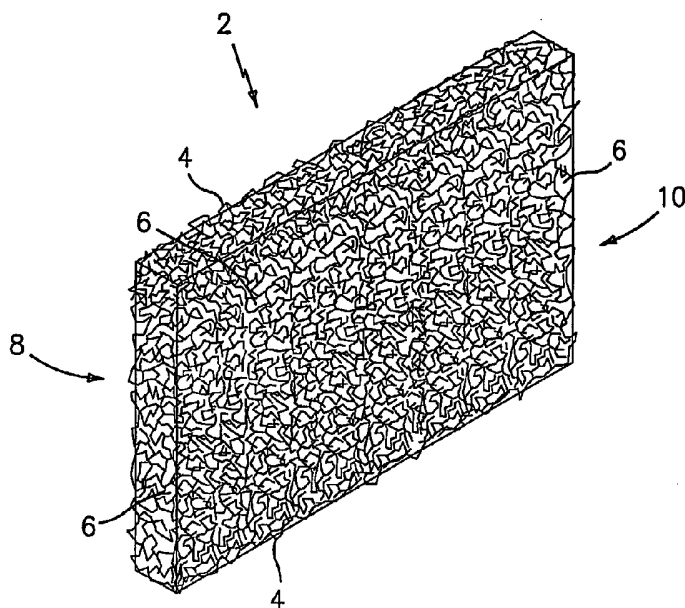
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PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM,
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[Continued on next page]

(54) Title: METHOD AND STRUCTURE FOR DESULFURIZING GASOLINE OR DIESEL FUEL FOR USE IN A FUEL CELL
POWER PLANT



(57) Abstract: A sulfur scrubbing method and structure is operable to remove substantially all of the sulfur present in an undiluted oxygenated hydrocarbon fuel stock supply which can be used to power an internal combustion engine or a fuel cell power plant in a mobile environment, such as an automobile, bus, truck, boat, or the like, or in a stationary environment. The fuel stock can be gasoline, diesel fuel, or other like fuels which contain relatively high levels of organic sulfur compounds such as mercaptans, sulfides, disulfides, thiophenes, and the like. The undiluted hydrocarbon fuel supply is passed through a desulfurizer bed (2) which is provided with a high surface area nickel reactant, and wherein essentially all of the nickel reactant in the scrubber bed reacts with sulfur in the fuel stream, so as to remove sulfur from the fuel stream by converting it to nickel sulfide on the scrubber bed. The desulfurized organic remnants of the fuel stream continue through the remainder of the fuel processing system in the fuel cell power plant, or through the internal combustion

engine. The desulfurizer bed is preferably formed from a high surface area ceramic foam monolith (22), the pores (26) of which are coated with the high surface area nickel reactant. The use of the foam monolith combined with the high surface area of the reactant, enables essentially 100% of the nickel reactant to come into contact with the fuel stream being desulfurized. The scrubber bed can also be formed from high surface area nickel coated alumina pellets, from a high surface area nickel coated ceramic extrusion, from high surface area nickel pellets, and from high surface area nickel extrudates.



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B. FIELDS SEARCHED Minimum documentation searched (classification system followed by classification symbols) U.S. : 502/259, 302, 303, 304, 327, 332, 335, 337, 355, 407, 415, 439, 527.24, 517; 423/244.01, 244.02, 244.1. Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 4,132,672 A (WISE et al) 02 January 1979 (02.01.1979), see entire document.	1-15
X	US 4,002,658 A (DALLA BETTA et al) 11 January 1977 (11.01.1977), see entire document.	1-16
X	US 4,160,745 A (MURRELL et al) 10 July 1979 (10.07.1979), see entire document.	1-15
A	US 4,026,823 A (VAN HOOK et al) 31 May 1977 (31.05.1977), see entire document.	1-16
A	US 4,233,187 A (ATWOOD et al) 11 November 1980 (11.11.1980), see entire document.	1-16
A	US 6,534,441 B1 (BARTLEY et al) 18 March 2003 (18.03.2003), see entire document.	1-16
A	US 5,534,475 A (MIRAMONTES CARDENAS et al) 09 July 1996 (09.07.1996), see entire document.	1-16
A	US 4,295,818 A (ANGWIN et al) 20 October 1981 (20.10.1981), see entire document.	1-16
A	US 3,998,758 A (CLYDE) 21 December 1976 (21.12.1976), see entire document.	1-16
☒ Further documents are listed in the continuation of Box C. ☐ See patent family annex.		
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C. (Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 4,134,860 A (HINDIN et al) 16 January 1979 (16.01.1979), see entire document.	1-16