



Europäisches Patentamt
European Patent Office
Office européen des brevets



(11) **EP 1 528 097 A3**

(12) **EUROPEAN PATENT APPLICATION**

(88) Date of publication A3:
13.07.2005 Bulletin 2005/28

(43) Date of publication A2:
04.05.2005 Bulletin 2005/18

(21) Application number: **04024823.9**

(22) Date of filing: **19.10.2004**

(51) Int Cl.7: **C10L 1/12**, C10L 1/18,
C10L 1/24, C10L 1/30,
C10L 10/00, C10L 10/02,
C10L 1/26

(84) Designated Contracting States:
**AT BE BG CH CY CZ DE DK EE ES FI FR GB GR
HU IE IT LI LU MC NL PL PT RO SE SI SK TR**
Designated Extension States:
AL HR LT LV MK

(30) Priority: **29.10.2003 US 696618**

(71) Applicant: **Afton Chemical Corporation
Richmond, Virginia 2319 (US)**

(72) Inventors:
• **Aradi, Allen, A.**
Richmond Virginia 23233 (US)
• **Smith, James, B.**
Richmond Virginia 23236 (US)

(74) Representative: **Schwabe - Sandmair - Marx
Stuntzstrasse 16
81677 München (DE)**

(54) **Method for reducing combustion chamber deposit flaking**

(57) A method reduces combustion chamber deposit flaking and spark ignited internal combustion engines. The method includes supplying a fuel having an additive that includes a metal-containing compound to a spark ignited internal combustion engine. The metal-containing compound is supplied in an amount effective

to reduce combustion chamber deposit flaking. In one example, the metal is manganese and the additive compound is MMT. The reduction or elimination of combustion chamber deposit flaking means a reduction in cold start emissions from the engine.

EP 1 528 097 A3



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 04 02 4823

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
X A	US 2003/097783 A1 (JORDAN FREDERICK L) 29 May 2003 (2003-05-29) * paragraphs [0036], [0037], [0067], [0068], [0070], [0077], [0118], [0139], [0140], [0162] - [0170], [0223], [0229], [0237]; claims 1,4,8,24,39; tables 1,29,32,36 * * paragraphs [0241], [0256] * -----	2,13,14 12,15	C10L1/12 C10L1/18 C10L1/24 C10L1/30 C10L10/00 C10L10/02 C10L1/26
X	US 4 191 536 A (NIEBYLSKI, LEONARD M) 4 March 1980 (1980-03-04) * column 2, line 14 - line 32; claims 15-21; example 1 * * column 4, line 10 - line 11 * * column 4, line 39 - line 48 * -----	1-4,7, 9-11	
X	US 3 127 351 A (BROWN ET AL.) 31 March 1964 (1964-03-31) * column 2, line 51 - line 56; claims 1-7,18,26; examples 10,11,17 * * column 3, line 45 - line 57 * * column 5, line 33 - line 47 * -----	1-4,7, 9-11,13, 15	TECHNICAL FIELDS SEARCHED (Int.Cl.7) C10L
X	GB 886 447 A (ESSO RESEARCH AND ENGINEERING COMPANY) 10 January 1962 (1962-01-10) * page 2, line 27 - line 68; claim 1; tables page,5 * -----	1,2,13, 15	
X	GB 787 374 A (ETHYL CORPORATION) 4 December 1957 (1957-12-04) * page 2, line 94 - line 109; claims 1-3 * -----	1-5,9	
X	US 4 690 687 A (JOHNSTON ET AL) 1 September 1987 (1987-09-01) * column 31, line 15 - line 27; examples 11,13 * ----- -/--	1-4,8,9, 13	
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 19 May 2005	Examiner de La Morinerie, B
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

5

EPO FORM 1503 03 82 (P04C01)



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 04 02 4823

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
D,X	EP 0 466 512 B (ETHYL CORPORATION) 29 June 1994 (1994-06-29) * page 16, line 29 - line 34; claims 1,6; examples 2,3 *	1-4,7, 9-11, 13-15	
D,X	US 5 113 803 A (HOLLRAH ET AL) 19 May 1992 (1992-05-19) * column 5, line 1 - line 30; claims 1,10,11,16-20; table 1 *	1-4,7, 9-12,14	
A	US 3 442 631 A (MARTIN E. GLUCKSTEIN) 6 May 1969 (1969-05-06) * column 4, line 6 - line 75; claim 1 *	1-4,7, 10,11	
			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 19 May 2005	Examiner de La Morinerie, B
<p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document</p> <p>T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document</p>			

5
EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 04 02 4823

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

19-05-2005

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 2003097783 A1	29-05-2003	BR	0208270 A	29-06-2004
		CA	2373327 A1	22-09-2002
		CN	1514871 A	21-07-2004
		EP	1370632 A2	17-12-2003
		WO	02077131 A2	03-10-2002
		US	2003093942 A1	22-05-2003
		US	2003093943 A1	22-05-2003
		US	2003093944 A1	22-05-2003
		US	2003089026 A1	15-05-2003
		US	2003093945 A1	22-05-2003
		US	2003089027 A1	15-05-2003
		US	2003097782 A1	29-05-2003
		US	2003089028 A1	15-05-2003
		US	2003089029 A1	15-05-2003
		US	2003089030 A1	15-05-2003
		US	2003167679 A1	11-09-2003

US 4191536	A	04-03-1980	NONE	

US 3127351	A	31-03-1964	NONE	

GB 886447	A	10-01-1962	NL 248043 A	

GB 787374	A	04-12-1957	NONE	

US 4690687	01-09-1987	US	4659338 A	21-04-1987
		AR	243589 A1	31-08-1993
		AT	77828 T	15-07-1992
		AT	118528 T	15-03-1995
		AT	154068 T	15-06-1997
		AU	591394 B2	30-11-1989
		AU	6192986 A	10-03-1987
		AU	600058 B2	02-08-1990
		AU	8253087 A	31-03-1988
		BR	8606850 A	03-11-1987
		CA	1303853 C	23-06-1992
		CN	86106817 A ,C	27-05-1987
		DE	3650239 D1	23-03-1995
		DE	3650239 T2	08-06-1995
		DE	3650634 D1	10-07-1997
		DE	3650634 T2	15-01-1998
		DE	3685877 D1	06-08-1992
		DE	3685877 T3	29-07-1999
		DE	233250 T1	17-03-1988
		DK	66695 A	12-06-1995
		DK	192587 A	16-04-1987

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 04 02 4823

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

19-05-2005

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 4690687	A		EP 0233250 A1	26-08-1987
			EP 0423744 A1	24-04-1991
			EP 0579339 A1	19-01-1994
			ES 2001515 A6	01-06-1988
			FI 871661 A	15-04-1987
			FI 871707 A	16-04-1987
			HK 36993 A	23-04-1993
			IL 79599 A	31-01-1991
			JP 7088514 B	27-09-1995
			JP 63500602 T	03-03-1988
			MX 164983 B	13-10-1992
			NO 871551 A ,B,	13-04-1987
			NO 952019 A	22-05-1995
			SG 15993 G	16-04-1993
			WO 8701126 A1	26-02-1987
			IN 167837 A1	29-12-1990
			US 4804389 A	14-02-1989
			ZA 8606177 A	25-03-1987

EP 0466512	B	15-01-1992	AU 651116 B2	14-07-1994
			AU 8016691 A	16-01-1992
			CA 2045706 A1	14-01-1992
			DE 69102683 D1	04-08-1994
			DE 69102683 T2	20-10-1994
			EP 0466512 A1	15-01-1992
			ES 2055964 T3	01-09-1994
			JP 3112990 B2	27-11-2000
			JP 4226597 A	17-08-1992
			US 5599357 A	04-02-1997

US 5113803	A	19-05-1992	AU 643604 B2	18-11-1993
			AU 1389892 A	08-10-1992
			CA 2062552 A1	02-10-1992
			EP 0507510 A1	07-10-1992
			JP 5117674 A	14-05-1993

US 3442631	A	06-05-1969	NONE	

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82