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(54) Title: GAS-GENERATING ADDITIVES HAVING IMPROVED SHELF LIVES FOR USE IN CEMENT COMPOSITIONS, AND ASSOCIATED METHODS

(57) Abstract: According to various embodiments, gas-generating additives for use in a cement composition comprise: a gas-generating material at least partially coated with a mixture comprising a fatty acid ester of sorbitan, glycerol, or pentaerythritol and having a shelf life of about 12 months or greater. The gas-generating additives may also include a C₈-C₁₈ hydrocarbon. In more embodiments, cement compositions comprise: a gas-generating material at least partially coated with a mixture comprising a fatty acid ester of sorbitan, glycerol, or pentaerythritol and a C₈-C₁₈ hydrocarbon for increasing a shelf life of the gas-generating material. In yet more embodiments, cement compositions comprise: a cement; a fluid for making the cement composition pumpable; a hydrogen-generating material at least partially coated with a mixture for delaying a hydrogen-generating reaction, the mixture comprising sorbitan monooleate and an isoparaffin.



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INTERNATIONAL SEARCH REPORT

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A. CLASSIFICATION OF SUBJECT MATTER

INV. C04B20/10 C04B38/02 C04B28/02

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

C04B C09K

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 practical, search terms used)

EPO-Internal, WPI Data, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2004/221990 A1 (HEATHMAN JAMES F [US] ET AL) 11 November 2004 (2004-11-11) paragraph [0011] - paragraph [0020] examples 1-4 claims 1-62	1-41
A	GB 299 484 A (AEROCRETE FOREIGN LTD; CHALMERS NICOL) 29 October 1928 (1928-10-29) claims 1-8	1-41
A	JP 11 100279 A (KAWASAKI STEEL CO; YAMATO KINZOKUFUN KOGYO KK) 13 April 1999 (1999-04-13) abstract	1-41



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INTERNATIONAL SEARCH REPORT

Information on patent family members

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Patent document cited in search report		Publication date	Patent family member(s)		Publication date
US 2004221990	A1	11-11-2004	CA	2524480 A1	18-11-2004
			EP	1663903 A2	07-06-2006
			WO	2004099557 A2	18-11-2004
			MX	PA05011883 A	02-03-2006
			US	2005204960 A1	22-09-2005
GB 299484	A	29-10-1928	BE	350312 A	
JP 11100279	A	13-04-1999	NONE		