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(54) **Title:** ELECTROMETHANOGENIC REACTOR AND PROCESSES FOR METHANE PRODUCTION

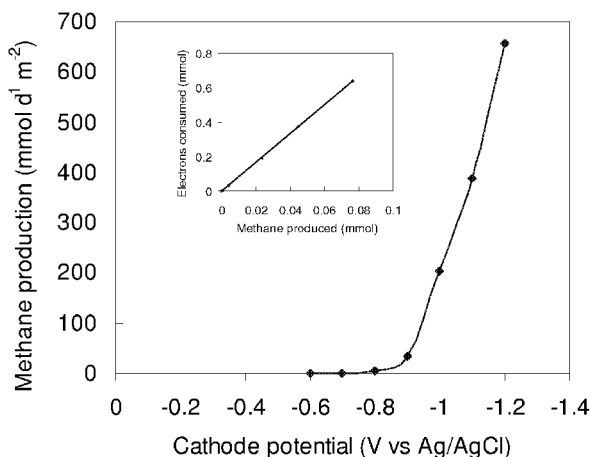


FIGURE 3

(57) **Abstract:** Increasing competition for fossil fuels, and the need to avoid release carbon dioxide from combustion of these fuels requires development of new and sustainable approaches for energy production and carbon capture. Biological processes for producing methane gas and capturing carbon from carbon dioxide are provided according to embodiments of the present invention which include providing an electromethanogenic reactor having an anode, a cathode and a plurality of methanogenic microorganisms disposed on the cathode. Electrons and carbon dioxide are provided to the plurality of methanogenic microorganisms disposed on the cathode. The methanogenic microorganisms reduce the carbon dioxide to produce methane gas, even in the absence of hydrogen and/or organic carbon sources.

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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)

C12P 5/02

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Korean utility models and applications for utility models
Japanese utility models and applications for utility models
(Chinese Patents and application for patent)

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

eKOMPASS(KIPO internal), PubMed, & Keywords: methane, electromethanogenic, anode, cathode, biocathode, methanogenic, MFC, MEC and similar terms

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
PX	Environ. Sci. Technol. (2009) 43: 3953-3958 (Online Publication 26 March 2009) See the entire document.	1-21
X A	Appl. Environ. Microbiol. (1999) 65: 2912-2917 See the entire document.	14-16, 18, 20 1-13, 17, 19, 21
A	Biosci. Biotechnol. Biochem. (2008) 72: 286-294 (Online Publication 07 February 2008) See the entire document, especially, abstract; figure 1; table 2.	1-21
A	Electroanalysis (2006) 18: 2009-2015 See abstract; figure 1, page 2010, left column -page 2014, left column.	1-21
A	Biotechnol. Adv. (2007) 25: 464-482 See the entire document.	1-21
A	Environ. Sci. Technol. (2008) 42: 629-634 (Online Publication 07 December 2007) See figure 1(C); pages 633.	1-21

 Further documents are listed in the continuation of Box C. See patent family annex.

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Date of the actual completion of the international search

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Information on patent family members

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
None			