US2018 197643	15/795,171	Morris Murray	Photon Detection
US2019 077657	16/178,649	Burgess Greenwald Barbee	Gas-loading Apparatus
US2018 0193817	15/617,364	Kim	Continuosly Running

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PTO/AIA/14 (11-15)
Approved for use through 04/30/2017. OMB 0651-0032
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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	438/49 UTIL
	Application Number	
Title of Invention	A CONTINUOUSLY RUNNING EXOTHERMIC REACTOR SYSTEM	

The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76.
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Secrecy Order 37 CFR 5.2:

☐ Portions or all of the application associated with this Application Data Sheet may fall under a Secrecy Order pursuant to 37 CFR 5.2 (Paper filers only. Applications that fall under Secrecy Order may not be filed electronically.)

Inventor Information:

Inventor 1 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Kyu-Jung		Kim	

Residence Information (Select One) ● US Residency Non US Residency Active US Military Service

City		State/Province	IL	Country of Residence	US

Mailing Address of Inventor:

Address 1			
Address 2			
City		State/Province	IL
Postal Code		Country	US

All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the **Add** button. Add

Correspondence Information:

Enter either Customer Number or complete the Correspondence Information section below.
For further information see 37 CFR 1.33(a).

☐ **An Address is being provided for the correspondence Information of this application.**

Customer Number	76934		
Email Address	docket@nkpatentlaw.com	Add Email	Remove Email

Application Information:

Title of the Invention	A CONTINUOUSLY RUNNING EXOTHERMIC REACTOR SYSTEM		
Attorney Docket Number	438/49 UTIL	Small Entity Status Claimed	☒
Application Type	Nonprovisional		
Subject Matter	Utility		
Total Number of Drawing Sheets (if any)	11	Suggested Figure for Publication (if any)	

A CONTINUOUSLY RUNNING EXOTHERMIC REACTOR SYSTEM

TECHNICAL FIELD

Cross-Reference to Related Application

[0001] This application claims the benefit of priority of U.S. Provisional Patent Application No. 62/347,910, titled "A CONTINUOUSLY RUNNING EXOTHERMIC REACTOR SYSTEM" filed on June 9, 2016 which is incorporated herein in its entirety by this reference.

TECHNICAL FIELD

[0002] The present disclosure relates generally to alternative energy technologies and, more particularly, to thermal reaction systems.

BACKGROUND

[0003] Over the past 30 years, scientists have observed the phenomena of excess heat being generated when a transition metal or metal alloy such as palladium, nickel or platinum, is exposed to hydrogen gas, or one of its isotopes under pressure.

[0004] U.S. Patent No. 8,603,405 (hereinafter the ' 405 patent) discloses a thermal reactor based on dislocation site techniques. The reactor is designed to generate an exothermic reaction based on the interaction between one or more isotopes of hydrogen and a plurality of metallic micro-structures. A plurality of metallic micro-structures is exposed to gas comprising hydrogen or an isotope of hydrogen under pressure inside a reaction chamber. The process gas, comprising hydrogen or an isotope thereof, is applied via a gas inlet to the reaction chamber containing the metallic micro-structures. The reaction chamber is pressurized to form hydrogen clusters in the interstitial spaces of the metallic micro-structures. When the pressure inside the reaction chamber reaches a pre-determined level, an exothermic reaction is triggered. The exothermic reaction continues until the hydrogen clusters are consumed by the reaction.

Controlled Thermal Energy Engineering, Inc. (CTEE)

kyujung@illinois.edu **(217) 766-8150**

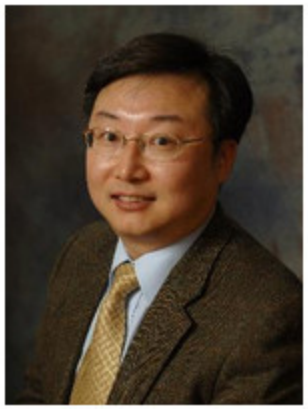
60 Hazelwood Dr. Champaign, IL

CTEE (Controlled Thermal Energy Engineering) is developing novel thermal energy conversion technologies which increase a system's energy-efficiency by capturing and recycling heat. Low-level or otherwise underutilized heat sources are employed via metal-alloy and hydrogen interaction characteristics. The technology allows a heat-driven system to autonomously operate in three types of thermodynamic cycles: cooling, heat-pump and heat up-grade modes.

Kyu-Jung Kim

illinois.edu

Department of Nuclear, Plasma, Radiological Engineering
University of Illinois at Urbana-Champaign



As a scientific and engineering researcher, Dr. Kim's research interest has been focused to make an actual contribution to solving the issues of global energy. Therefore his research areas have been centered on a various energyconversion system, such as fuel cell technology, which converts the chemical energy directly to the electrical power, metal hydride thermal energy conversion technology that upgrades heat or generate a chill use of heat by means of using the thermo-physical characteristic property of various types of metal hydride alloy that interact with hydrogen molecules. Dr. Kim's research experiencehas brought the 131 patents published, 41 patents issued. He was a chief researchengineer of a global major company; LG Electronics Inc., and managed projects with collaborations of international teams of academia in Japan, China, Russia and USA.

Research Field 1:

Direct Borohydride Feul Cell

2002 ~ 2007, LG Electronics Inc., Korea

2007 ~ Present, Nuclear, Plasma and Radiology Department, University of Illinois at Urbana-Champaign, IL

The DBFC has been the subject of his research since I started working as the chief research engineer in the digital appliance lab at LG Electronics, South Korea in 2002.

The DBFC is relatively new types of fuel cells that are currently in the developmental stage, compared to the hydrogen fuel cells that have been introduced and utilized for several scores of years. The DBFC uses borohydride, which is a water soluble chemical compound in solid form and abundant natural resources in US, as the fuel.

The designing of DBFC is much different from other types of fuel cells due to the electro-chemical reaction that requires direct contact of fuel and catalytic electrode, which directly generates electrical energy. The DBFC has

NPRE-470
Low Energy Nuclear Reaction Cell
Introduction to LENR Research

Dr. Kyu-Jung Kim

Department of
Nuclear, Plasma and Radiology Engineering
University of Illinois