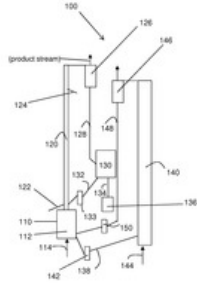
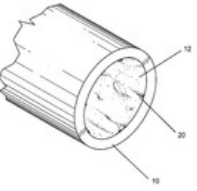
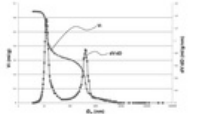
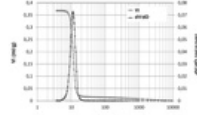
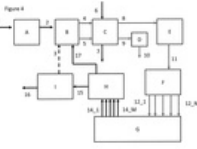
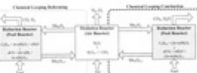
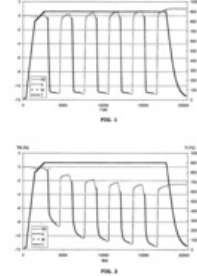
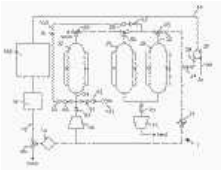
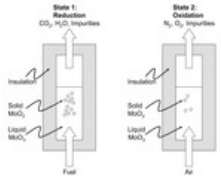


#	Title	Publication number	Publ. date	Applicant/Assignee	
1.	Sour gas combustion using in-situ oxygen production and chemical looping combustion	US20150204539	2015-07-23	ARAMCO SERVICES SAUDI ARABIAN OIL*	
A chemical looping combustion (CLC) process for sour gas combustion includes a number of reaction zones and is configured to provide in-situ oxygen production and in-situ removal of SO₂ from a product gas stream by reacting the SO₂ with a calcium-based sorbent at a location within one reaction zone. The CLC process is also configured such that the in-situ oxygen production results from the use of a metal oxide oxygen carrier which is purposely located such that it does not directly contact the sour gas, thereby eliminating the generation of undesirable sulfur-based metal oxides.					
2.	Activation of waste metal oxide as an oxygen carrier for chemical looping combustion applications	US20150343416	2015-12-03	ARAMCO SERVICES SAUDI ARABIAN OIL*	
A process for producing black powder oxygen carriers for use in a chemical looping combustion unit includes the steps of: (a) removing and collecting the black powder waste material that was formed in a gas pipeline; (b) pre-treating the collected black powder to adjust its spherical shape to avoid attrition and fines production; and (c) activating the black powder to increase its reactivity rate and produce the black powder oxygen carrier that is suitable for use in the chemical looping combustion process as an oxygen carrier.					
3.	Macroporous oxygen carrier solid with a refractory matrix, method for the preparation thereof, and use thereof in a chemical-looping oxidation-reduction method	WO2018115344	2018-06-28	IFP ENERGIES NOW* TOTAL RAFFINAGE CHIMIE*	
The invention relates to an oxygen carrier solid, its preparation and its use in a method of combustion of a hydrocarbon feedstock by active mass chemical-looping oxidation-reduction, i.e. chemical-looping combustion (CLC). The solid, which is in the form of particles, comprises an oxidation-reduction active mass composed of metal oxide(s) dispersed in a ceramic matrix comprising at least one oxide with a melting point higher than 1500°C, such as alumina, and has, initially, a specific macroporous texture. The oxygen carrier solid is prepared from an aqueous suspension containing precursor oxide grains for the ceramic matrix that have a specific size, by a spray-drying technique.					
4.	Macroporous oxygen carrier solid with a refractory feldspar/feldspathoid, method for the preparation thereof, and use thereof in a chemical-looping oxidation-reduction method	WO2018115345	2018-06-28	IFP ENERGIES NOW* TOTAL RAFFINAGE CHIMIE*	
The invention relates to an oxygen carrier solid, its preparation and its use in a method of combustion of a hydrocarbon feedstock by active mass chemical-looping oxidation-reduction, i.e. chemical-looping combustion (CLC). The solid, which is in the form of particles, comprises an oxidation-reduction active mass composed of metal oxide(s) dispersed in a ceramic matrix comprising at least one feldspar or feldspathoid with a melting point higher than 1500°C, such as celsian, and has, initially, a specific macroporous texture. The oxygen carrier solid is prepared from a precursor of the ceramic matrix, obtained from a macroporous zeolitic material with zeolite crystals of a specific size, and a precursor of the oxidation-reduction active mass.					
5.	Integrated recovery of hydrocarbons from a subsurface reservoir with nitrogen injection	WO2014091024	2014-06-19	SHELL SHELL INTERNATIONALE RESEARCH*	
The invention concerns a method for the recovery of hydrocarbons from a natural gas subsurface reservoir, wherein a nitrogen stream (i) containing less than 10 ppm oxygen is injected into the natural gas reservoir, whereby the nitrogen stream (i) is prepared in and captured from a CLC reactor wherein a fuel is combusted through use of an oxygen carrier with a gas stream (ii) containing both oxygen and nitrogen, and wherein part of the hydrocarbons recovered from the natural gas reservoir are used as fuel in the CLC reactor. The invention further concerns an integrated production system with nitrogen injection for recovering hydrocarbons from a natural gas subsurface reservoir suitable for the above method.					
6.	Reactor for chemical-looping combustion	US20150241056	2015-08-27	UNIVERSITY OF CONNECTICUT*	
Systems and methods are provided for enhancement of gaseous CLC in a fixed-bed process, marked by an increase in CO₂ capture efficiency and oxygen carrier utilization, while reducing disadvantages of a conventional fixed-bed operation. The disclosed systems/methods provide a CLC fixed-bed reactor design in which the direction of the fuel gas is intermittently reversed during a single fuel oxidation step. In this reverse-flow mode, oxygen carrier reduction reactions are displaced over the ends of the reactor, which increases contact between fuel and oxidized solids and alleviates and/or mitigates problems of carbon deposition encountered by most oxygen carriers.					
7.	Redox masses having a axa'x'byb'y'o4 spinel type structure and use thereof in a chemical-loop redox process	WO2010040916	2010-04-15	IFP ENERGIES NOUVELLES* TOTAL	
The invention relates to a novel type of active mass and to the use thereof in chemical loop combustion methods. The active mass contains a spinel of the formula AXA'X-BYB'O₄. The active masses of the invention have a high oxygen transfer capacity and redox rates enabling the advantageous use thereof in the loop combustion method. A and A' may be identical and B and B' may also be identical.					

8.	Noble gas purification and recovery method	GB201001508	2010-03-17	GAS RECOVERY & RECYCLE* GAS RECOVERY & RECYCLING	
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9.	Liquid-phase chemical looping energy generator	US20110117004	2011-05-19	CONOCOPHILLIPS PHILLIPS 66*	
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