

New material based on manganese oxide with gas generation and high temperature regeneration capacity

CSIC has developed a material based on a mixture of metal oxides. This new material is capable of releasing oxygen gas during its reduction through an endothermic process and regenerating in air at high temperature (800-1000 °C) releasing energy. The material behaves in a stable manner in successive reduction-oxidation cycles and has improved properties with respect to other similar materials available for processes in this type of chemical loops.

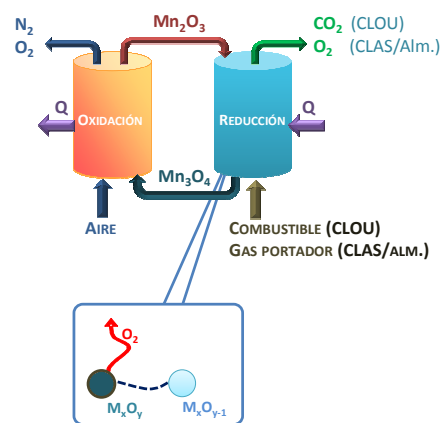
Companies interested in patent licensing are sought for the development and use of materials capable of releasing oxygen gas.

An offer for Patent Licensing

New material based on manganese oxide capable of regenerating in air at high temperature

The new material is based on mixtures of metal oxides with a majority component of manganese oxide (> 80% by weight). It can be prepared from an aqueous suspension containing the corresponding mixture of oxides, using available technologies, such as fluidized bed granulation and subsequent calcination. This new material presents a remarkable improvement with respect to other similar materials used in processes based on reduction-oxidation cycles, such as the possibility of regenerating in air at high temperature (800-1000°C) over successive cycles.

This novelty makes it especially attractive for processes involving redox reactions at high temperature (800-1000 °C). One process is the so-called combustion technology by chemical loop with decoupling of oxygen (CLOU), which allows the combustion of different fuels with inherent capture of the CO₂ generated in the combustion. Another process is the separation of air by chemical loop (CLAS). It is also possible to use this type of material in thermochemical energy storage processes of renewable origin.



Schematic of the process of reduction-oxidation of the new materials based on manganese oxides

Main innovations and advantages

- Regeneration capacity in air in successive cycles, without losing the ability to release oxygen gas.
- Range of action at temperatures between 800-1000 °C.
- Avoid the generation of harmful gases such as CO₂.
- Applicable to processes that require the production of pure or nitrogen-free O₂ (CLOU and CLAS) and in the thermochemical storage of renewable energy. In the CLOU process, the efficiency of the combustion process increases.

Patent Status

Priority patent application with possibility of international extension

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