

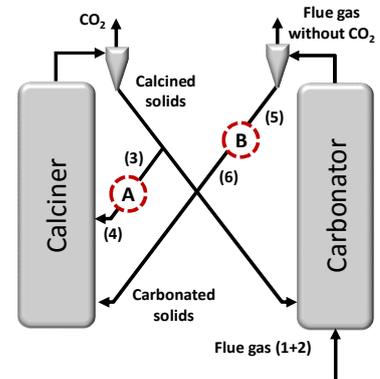
## CO<sub>2</sub> capture from a flue gas with low energy penalty

A research group of CSIC has developed process variant of the Calcium Looping system for CO<sub>2</sub> capture from a flue gases gas, allowing for a significant reduction of the energy demand in the calciner. The process is based in the direct heat exchange between the combustion gas and the solid streams entering the calciner, making use of common devices in the cement industry. Partners interested in developing the technology and a patent license are being sought.

### The fight against climatic change

CO<sub>2</sub> capture and storage (CCS) from fossil fuel or biomass power plants is a widely recognized climate change mitigation option. Although there are mature technologies for large scale CO<sub>2</sub> capture, they are relatively costly and/or energy-intensive.

In particular, in power sector and in several industrial sectors (cement, steel, refinery, etc.) there is a need for more advanced technologies able to produce a low-cost pure CO<sub>2</sub> stream with low energy penalty.

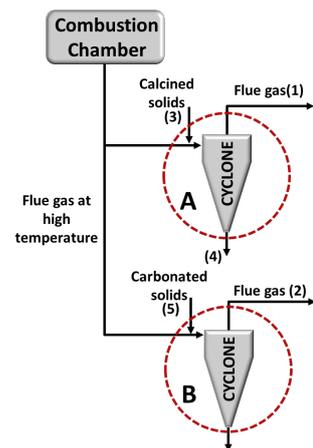


Improved method for CO<sub>2</sub> capture

### Pure oxygen consumption reduction in the calciner

The Calcium Looping process, CaL, has important advantages owing to its low energy penalty, low cost of sorbent precursor and the possibility of employing the CaO purge in other Calcium based large scale industrial processes (e.g. cement industry). However, the considerable amount of pure oxygen needed in the calciner is a serious disadvantage. This is due to the high cost of associated O<sub>2</sub> production equipment and the high energy consumption for its production.

The novel process configuration attempts to drastically reduce the calciner energy requirement and therefore the oxygen consumption. This is achieved by transferring heat to the solids entering the calciner by putting these solids in direct contact with combustion flue gases at high temperature.



Gas/solid preheating

### Main applications and advantages

- The heat transfer to the calciner by an internal recirculation of pre-heated solids allows a drastic reduction of pure oxygen demand or even the elimination of its need in the calciner.
- The pre-heating of the carbonate rich solid stream exiting from the carbonator also allows a reduction in the calciner energy demand.
- The system makes use of cyclone heat exchangers similar to those present in cement plants.
- Easy integration with the power plant steam cycle reducing the overall energy penalty.
- Low cost of the sorbent precursor (natural limestone).
- CaO purges can be used in cement production, in desulphurisation or, in general, in other industrial processes with large consumption of Calcium based materials.

### Patent Status

European patent has been filed

### For further information

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