

Title (en)
SEPARATION OF CARBON DIOXIDE (CO₂) FROM GAS MIXTURES BY CALCIUM BASED REACTION SEPARATION (CaRS-CO₂) PROCESS

Title (de)
ABTRENNUNG VON KOHLENDIOXID (CO₂) AUS GASGEMISCHEN DURCH CALCIUMBASIERTES REAKTIONSABTRENNUNGSVERFAHREN (CARS-CO₂)

Title (fr)
SEPARATION DE DIOXYDE DE CARBONE (CO₂) DE MELANGE DE GAZ PAR PROCESSUS DE SEPARATION PAR REACTION A BASE DE CALCIUM (CARS-CO₂)

Publication
EP 1899049 A4 20101208 (EN)

Application
EP 06774232 A 20060628

Priority
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Abstract (en)
[origin: WO2007002792A2] A reaction-based process has been developed for the selective removal of carbon dioxide (CO₂) from a multicomponent gas mixture to provide a gaseous stream depleted in CO₂ compared to the inlet CO₂ concentration in the stream. The proposed process effects the separation of CO₂ from a mixture of gases (such as flue gas/fuel gas) by its reaction with metal oxides (such as calcium oxide). The Calcium based Reaction Separation for CO₂ (CaRS-CO₂) process consists of contacting a CO₂ laden gas with calcium oxide (CaO) in a reactor such that CaO captures the CO₂ by the formation of calcium carbonate (CaCO₃). Once "spent", CaCO₃ is regenerated by its calcination leading to the formation of fresh CaO sorbent and the evolution of a concentrated stream of CO₂. The "regenerated" CaO is then recycled for the further capture of more CO₂. This carbonation-calcination cycle forms the basis of the CaRS-CO₂ process. This process also identifies the application of a mesoporous CaCO₃ structure, developed by a process detailed elsewhere, that attains >90% conversion over multiple carbonation and calcination cycles. Lastly, thermal regeneration (calcination) under vacuum provided a better sorbent structure that maintained reproducible reactivity levels over multiple cycles.

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