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(57) Abstract :

The present invention relates to a fabric-based structured bed gas-solid contactor system that provides a low bed pressure drop and higher adsorption capacity adsorbent using a facile synthesis method that is easily implemented for capturing carbon dioxide (CO2) gas from various point sources and simultaneously become more economical, environmentally sustainable and energy efficient. The invention further relates to a process for CO2 capture in fabric-based structured bed gas-solid contactor system. The system comprises a pair of adsorber/desorber unit (101, 102) being configured with a perforated tube support (117) wrapped with a functionalized fabric cloth-based adsorbent thereon, a regeneration and purge gas section including pure CO2 tank (107) connected to the inlet (118) of said unit (101, 102), an air compressor and storage unit (109, 110) connected to the inlet (118) of said unit (101, 102) in series with a pure CO2 tank (107), a steam generating unit incorporating a water storage (112), a pump (113), a steam generator and a steam trap unit (114, 115) connected to the inlet (118) of each adsorber/desorber unit (101, 102), and a regenerated CO2 storage tank with steam trap (103, 104) connected to the outlet (119) of each adsorber/desorber unit (101, 102).

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