

Abstract

An Amine Solution for Capturing and Absorbing Carbon Dioxide and a Method for Capturing and Absorbing Carbon Dioxide in Gas

The present invention provides an amine solution for capturing and absorbing carbon dioxide, comprising monoethanolamine and at least one first activator selected from the group consisting of 2-(tert-butylamino)-2-ethoxy ethanol, N-methyl monoethanolamine, N-tert-butyl diethanolamine, nitrilotriacetic acid and N-hydroxyethyl-ethylenediamine, based on the total amount of the amine solution, the content of monoethanolamine is in a range of 5-40% by weight, and the total content of the first activators is in a range of 5-10% by weight. The present invention further provides a method for capturing and absorbing carbon dioxide in gas, which uses the amine solution provided by the present invention as an absorption solution through a hydrophobic hollow fiber module to capture and absorb the carbon dioxide in gas; amine solution absorbed with carbon dioxide is regenerated in a desorber, and regenerated amine solution is circularly used as the absorption solution. The hydrophobic hollow fiber module used in the method provided by the present invention has a large specific surface area and can raise the removal ratio of carbon dioxide, and overcomes the problems of conventional absorbers, such as flooding, entrainment and bias flow, and effectively reduces the possibility of contacting the amine solution with the oxygen in the flue gas so that the degradation consumption of the amine solution is lowered. Furthermore, even under high flow rate of gas and high flow rate of liquid, the method provided by the present invention can still maintain a high carbon dioxide removal ratio and meanwhile can obtain high-purity carbon dioxide product gas.

Figure 1

