



The engineers Alexander Schraven (left) and Matthias Schneider are coordinating the tests with the scrubbing liquids for capturing CO₂ in the test rig at the Herne CHP plant.

© Christina Geimer, BINE Informationsdienst

New scrubbing liquids with twice the capacity

13.12.2012

Scrubbing carbon dioxide from exhaust gases

Outside it is snowing and the Steag company's Herne CHP plant is working at full blast. It supplies around 625,000 households with district heating and electricity. At the base of the coal-fired power station's chimney shaft, the roughly nine-metre-high test plant for purifying flue gas is bathed in blue light. Here Creavis, Evonik's strategic research and development unit, is testing new scrubbing liquids for capturing CO₂. Until now this technology has been very energy-intensive and expensive for power plants. The use of more efficient scrubbing liquids is intended to change this.



The engineers are testing new scrubbing liquids for capturing CO₂ on the nine-metre-high test rig at the base of the chimney shaft.

© Evonik

Carbon dioxide contained within exhaust gases from industrial plants and power stations can be captured using various technologies. Although existing power plants can be retrofitted with CO₂ scrubbers, the energy and scrubbing liquid consumption has been very high. In the "New absorbers for more efficient CO₂ capturing" project, in short: EffiCO₂, engineers and chemists are therefore developing new scrubbing liquids for capturing CO₂. Their results up to now are raising hopes that the demand for energy and scrubbing liquid can be reduced.

CO₂ capacity of new scrubbing liquids has doubled

"In laboratory tests we have considerably increased the stability of several scrubbing liquids developed by us," reports Evonik engineer Alexander Schraven. They managed to increase the CO₂ capacity relative to existing scrubbing liquids, such as monoethanolamine (MEA). These laboratory results are currently being verified in the test plant with real flue gas.



Engineer Alexander Schraven uses more than 50 measurement sensors to record data for characterising the scrubbing liquid.

© Christina Geimer, BINE Informationsdienst

In the test plant at the base of the chimney shaft, the CO₂ is being captured using part of the flue gas from the CHP plant. New scrubbing liquids based on amines and amino acids have been developed and tailored for capturing the CO₂. The main advantage of amino acid salts is that they are not volatile. This means that no absorbents are removed with the

cleaned flue gas during the scrubbing process, since it is intended to use the scrubbing liquid in as many cycles as possible. Under realistic conditions, the desorption is conducted at up to 120 °C and the absorption at around 40 °C. The test plant is completely made of glass so that the engineers can also follow the process visually. In addition, around 50 measurement sensors supply around-the-clock information on the temperatures, flow rates and other parameters from the test plant. The data gained is being used to characterise the capturing process and to conduct computer-based simulations in preparation for a pilot phase.

Chemists and engineers from the Duisburg-Essen and Erlangen-Nuremberg universities are currently supporting the investigations. The German Federal Ministry of Education and Research is providing 2.5 million euros to fund the EffiCO2 project. Although the research project is coming to an end in April 2013, the Evonik and STEAG industrial partners want to continue operating the test plant. They want to follow this with a pilot phase with the scrubbing liquids. You can read the long version of the report at KraftwerkForschung.info.

(cg)