

MPP3 Aerosol Characterisation CATO-2

Publieke samenvatting / Public summary

Summary

Post combustion carbon capture (PCCC) is based on the removal of CO₂ after the combustion of a fossil fuel. Reactive absorption is one of the most important and most used techniques for the removal of CO₂ from flue gas. This reactive absorption process employs the reversible nature of the chemical reaction of an aqueous alkaline solvent (usually an amine) with an acid gas (CO₂). The amine-based solvent can be lost during the process due to degradation, vaporisation, mechanical losses and aerosol (mist) formation. The amount and character (size distribution) of the aerosols that can be formed strongly relates to the characteristics of the flue gas.

Recently, studies have appeared pointing out that aerosols can dominate the total amine emission at pilot plant scale to the order of several grams per Nm³. This not only exceeds environmental permits by an order of magnitude, but also leads to increased operating cost from solvent make-up. These risks were deemed to be very relevant for the ROAD project at MPP3. The objective of this study was to characterise the flue gas at MPP3 to assess its potential for aerosol based solvent emissions. In a first campaign, the findings indicated a low chance of aerosol-based emissions, while a second campaign proved that aerosol-based emission posed a significant risk for the success of the ROAD project. The results were used as a basis for further research in the AeroSolve project.

Background

Projectinformatie / Project information

Projectnummer / Project number

TKITOECA202-T2013-15

Subsidiebedrag / Grant amount

€ 23.306,00

Algemene informatie / General information

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CATO is the Dutch national R&D programme for carbon capture, transport and storage and involves a consortium of nearly 40 partners and comprises CATO-1, CATO-2 and now CATO-3. The last is funded by industrial partners and various government sources, including TKI, CLIMIT and EU ERA-NET. The CATO-2 programme aimed to facilitate and enable the integrated development of CCS demonstration sites in the Netherlands.

Project objective

This project quantified the flue gas characteristics that matter for aerosol formation and the character of the aerosols that might have been formed at the new Uniper power plant on the Maasvlakte in the Netherlands (MPP3). The MPP3 power plant was to have been used for the subsequently cancelled ROAD CCS demo project. However, the information gleaned remains of value.

Project results

The project involved measuring particle size distribution and number concentration, solvent emission measurements and SO₃ measurements. In a first campaign, the findings indicated a low chance of aerosol-based emissions, while a second campaign proved that aerosol-based emission posed a significant risk for the success of the ROAD project. The results were used as a basis for further research in the AeroSolve project.

De data in deze applicatie is afkomstig van de Rijksdienst voor Ondernemend Nederland (RVO) en wordt in samenwerking met de Topsector Energie ontsloten.

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