



CO₂ Capture using Amine PRocesses:
International Cooperation and
Exchange

Project: Caprice

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CORROSION ASPECTS

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0 PUBLIC SUMMARY

Among the technologies that are under study for CO₂ capture from flue gas, the separation process using monoethanolamine (MEA) could be the first to be available for immediate industrial applications in the next few years. The principles of CO₂ separation using alkanolamines were discovered nearly a century ago. The process has been applied successfully for several decades in areas such as natural gas processing or coal gasification. The application to flue gas treatment was introduced in the early 1980s, but was not widespread.

In such industrial processes, corrosion represents one of the major operational problems. For the capture of CO₂ from flue gas using MEA, the problem is even more critical since (i) MEA is one of the most corrosive amine when compared to secondary or tertiary amines that are also used for gas sweetening, and (ii) flue gas contains a certain amount of oxygen, which can react with the amine to form corrosive degradation products.

In the framework of the CAPRICE project, which is an International cooperation and exchange project supported by the EU, The International Test centre for CO₂ Capture from the University of Regina (CA) and IFP (F) have shared their experience on corrosion monitoring from CO₂ capture pilot plants. The first pilot plant facility is owned by ITC. It has a capacity to capture 1 ton CO₂/day from a natural gas burner. It is equipped with corrosion control instruments and other monitoring systems. The second pilot plant is located in a coal fired power station in Esbjerg (DK). It was built with the financial support of the UE through the CASTOR project under the lead of IFP. It has been in operation since early 2006, and has a capacity of 1.0 ton CO₂/hour. It is equipped with weight loss coupons for corrosion evaluation at different locations in the process.

The results of corrosion monitoring during MEA operation were compared for both pilot plants. It appeared that the critical parameters for corrosion were the CO₂ loading and temperature. The highest corrosivity was found in the hot rich amine at the inlet of the stripper.

From the results of both pilot plants, general recommendations are given for material selection and corrosion monitoring of CO₂ capture plants.

The rest of this document is confidential.
