

## H<sub>2</sub>S removal using Alkanolamines Spotlight Seminar February 2019

- Are heat stable salts, formed as Sulfide Oxidation Products, significant and can you simulate them?

We already simulate heat stable salts of chlorides. We did this as part of the Corrosion in Refining Overheads project. Also known as the Amine Hydrochloride Project. I did not have any data for sulfide oxidation products forming salts with DEA but in principle we should be able to model them.

- Are all the alkanolamines as well studied as DEA? What if we have another alkanolamine, can we use this same technique for the degradation?

OLI has studied the traditional alkanolamines as well as other amines as part of the Corrosion in Refining Overheads project. There are about 22 amines and alkanolamines that were studied. However, none of them had thermal degradation considered as part of that project. In this spotlight, only DEA was considered for degradation kinetics and much more work is needed to be done.

- Some companies use brand name amines that are proprietary blends. Would OLI need to know the constituent amines to be able to simulate that?

To accurately model a system, yes you would need to know the constituent amines. However, if accurate plant data is available it might be possible to reverse engineer the blends. However, it is cautioned that this may be prohibited by licensing agreements.

- Does OLI have any information about how the alkanol amines behave one versus another? Do they act like a family or is each amine different?

In terms of gas sweetening, you can easily compare the alkanolamines against each other. I don't know specifically how each family will react (e.g., primary vs secondary or tertiary amines).

- You mentioned creating a local model for the kinetics. How can we do the kinetic work you did? is it part of a service from OLI that we can use?

This local model can be done by you if you have the right kind of data. I was very lucky that I found actual rate constant data (Arrhenius form) in the literature. After some basic physical chemistry techniques (take enough logs and everything is a straight line) and I was able to back out the data. I tuned it (that's where the local model comes in) to match very specific conditions in the paper.

You said when looking at the reaction that you "Ran the simulation for 24 hours." How long is this in simulation/calculation time?

There is always a confusion about "Simulation time" and "Real time." This 24 hour of simulation time took 16 seconds in real time (on a Win10, 64 bit, I7 processor).