REFLECT

FACTSHEETS

EXPERIMENTS FOR IMPROVING THE EFFICIENCY OF GEOTHERMAL

REFLECT: Redefining geothermal fluid properties at extreme conditions

The key to improving geothermal efficiency is **preventing or controlling deleterious physical and chemical reactions** such as degassing and mineral precipitation that result in corrosion and scaling. Within the framework of the REFLECT project, investigations and experiments have been carried out to prevent these reactions.

DEGASSING EXPERIMENTS

The formation of free gas bubbles (**degassing**) during the production of geothermal waters can cause various issues like **scaling and blockage of reservoir pores**.

Within REFLECT, the aim has been to gather new data regarding degassing and its effect on fluid production from geothermal reservoirs.

Experiments performed within this study show good agreement with solubility theory of the conditions where free gas starts to form.

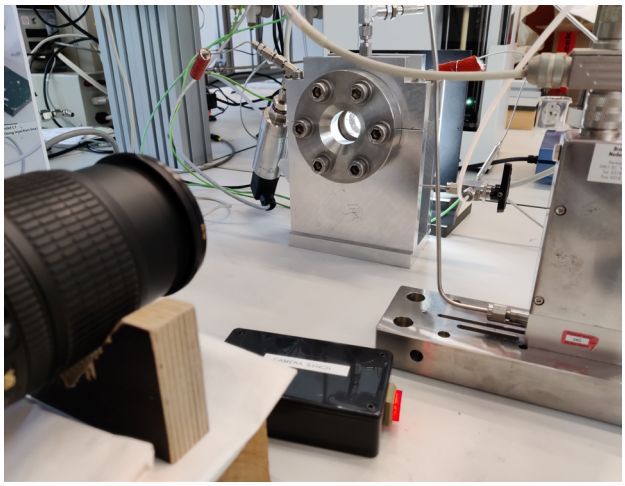

Figure 1: *The bubble point pressure is determined for gas-liquid mixtures at high pressure, temperature and salinity by visualising the degassing process in a pressure cell*

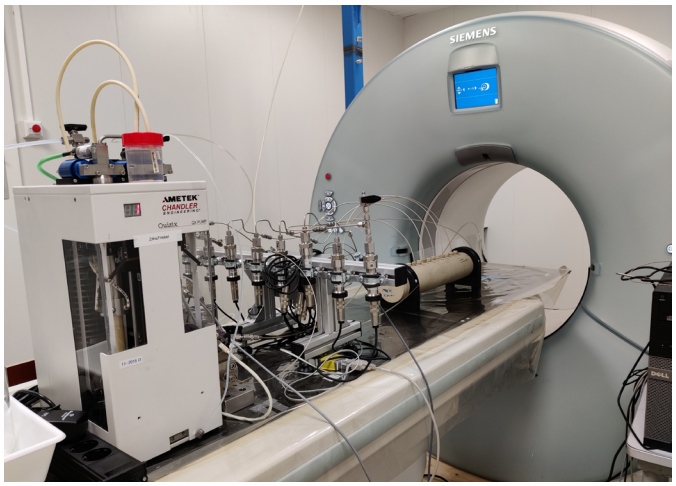

Figure 2: *A series of CT assisted coreflood experiments are performed to assess the extent to which free gas is limiting water flow inside rocks*

Further information

- *Abstract EGU21 SSS6.1 Session:* *Experimental investigation of degassing properties of geothermal fluids*
- *Abstract EGU22 ERE5.4 Session:* *Degassing kinetics of high salinity geothermal fluids*
- *Presentation from the REFLECT Geothermal Stakeholder Workshop:* *CO_2 degassing kinetics in bulk and porous media*

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SCALING INVESTIGATION AT TWO TURKISH SITES

A REFLECT team has been studying scaling issues at two geothermal power plants in the Western part of Turkey: the **Germencik and Tuzla plants**. The **antimony-based mineral stibnite** is the major problem in Germencik (Figure 4), while **silica-based scaling** is observed in Tuzla (Figure 3).

Within the framework of the project, scientists continue their work on both geothermal plants. Their main goal is to solve the scaling issues with 3D modelling, geochemistry studies and complementary work in the fields and laboratories.

The observations from the field have been repeated in well-controlled lab experiments as well as by modelling approaches to gain a full understanding of the precipitation process. Based on these observations, the most suitable solution would be to **use inhibitors by dosing specific compounds in the geothermal plants**. Caustic soda (NaOH) dosing could be a solution for the Germencik power plant. A systematic study to develop inhibitor molecules for the minimisation of scale formation in Tuzla is underway. The results of these examinations will yield valuable information on scaling formation.

Figure 3: *Silica based scaling in the Tuzla Power Plant*

Figure 4: *Stibnite scaling in the preheater system of the Germencik Power Plant*

Further information

- *REFLECT Webinar:* *Experiments for improving the efficiency of geothermal plants*
- *Scientific publication:* *Characterization of Sb scaling and fluids in saline geothermal power plants: A case study for Germencik Region (Büyük Menderes Graben, Turkey)*

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