

Analysis of precipitation rate of calcite in electrolysis process

Norio Yanagisawa[1]; Takahiro Matsumura[2]

[1] Geo-Energy Research Group, AIST; [2] REIKEN Inc.

1. Introduction

High frequency electrolysis was used for reducing calcium contained in underground water or the factory drainage as making calcium carbonate around the electrodes.

In this test, we measured ORP, pH, EC, Ca and HCO₃ during the scaling the calcium carbonate around electrodes and analyze the adhesion mechanism.

2. Device and the outline of the examination

DYNAKLEEN-150T by REIKEN Inc. was used for the experiment. This device consisted of control parts and electrode departments and collection did calcium carbonate with the electrode cover installed with preventing calcium carbonate from sticking to the electrode itself by making the anode of these three electrodes and the cathode change periodically in about the electrode.

A sample solution made calcium lactate dissolve in the distilled water. Moreover, sodium bicarbonate was mixed and carbonic acid ion concentration of the solution was adjusted.

3. Result

At test start ORP decrease rapidly and reached -250 in about 3 hours.

And, pH and electrical conductivity began to change and Ca, HCO₃ concentration decreased.

As a result that a solution becomes a state of reduction, a response with Ca and HCO₃ occurred, a calcium carbonate scale precipitate in this.

Ca composition of fluid decreased under reduction condition and the decreasing rate of Ca depends on pH. Then, pH decreased from 8 to 4.6 and after pH reached around 4.6, Ca did not react to HCO₃ when original content is Ca 200ppm and HCO₃ 200ppm.

If Ca original content is different from HCO₃, precipitation stopped at pH 5.5.