



# Sulfur Generation Mechanism

## during Electropolishing with Niobium Cavities and Its Cure

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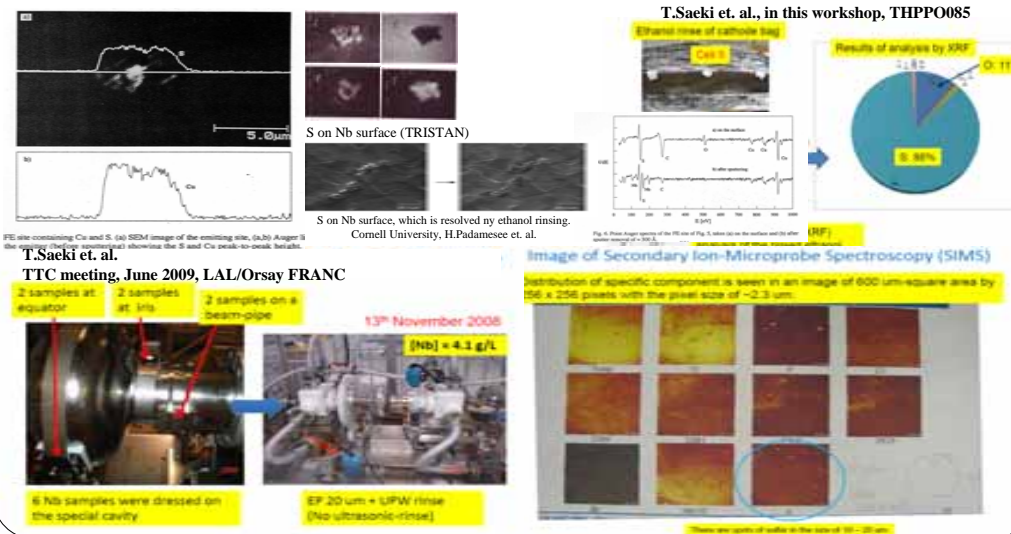
A: High Energy Accelerator Research Organization (KEK), Accelerator Lab

B: Nomura Plating

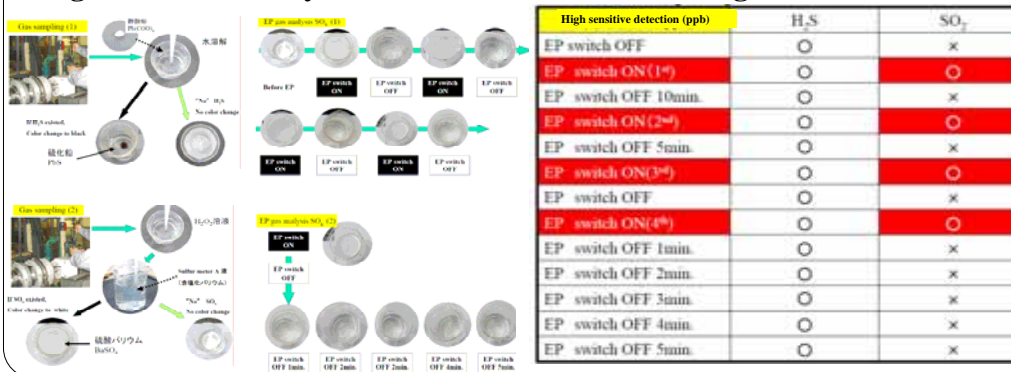
### Abstract

Electropolishing is well known to have surfer contamination on niobium cavities. So far many efforts have been done in order to remove the contamination in the SRF community: H<sub>2</sub>O<sub>2</sub> rinsing, Degreasing and Ethanol rinsing so on. Nobody understands the surfer generation mechanism, however recently we have found it. By the understating, we have taken a cure for our EP and no surfer has happened by naked eye inspection. In this pare we will present about the surfer generation mechanism and the cure.

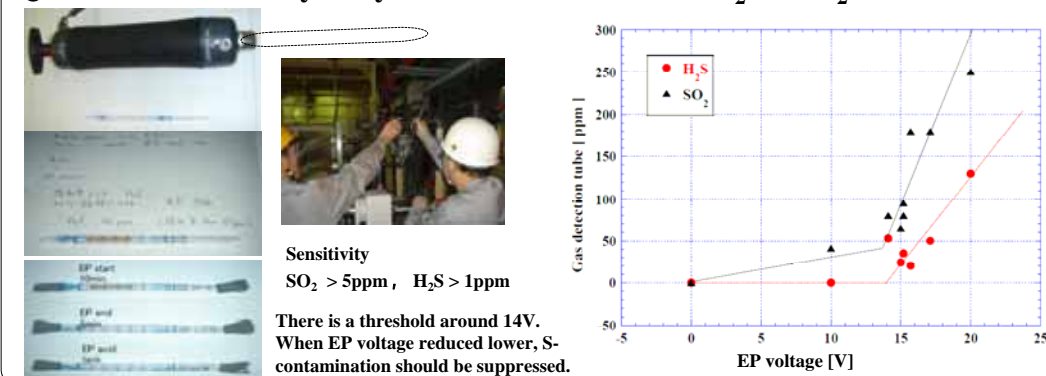
## Sulfur Contamination of Niobium SRF Cavities



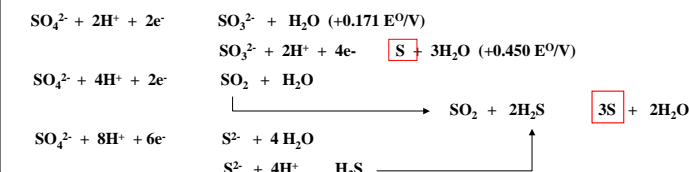
## High Sensitive Analysis of the Exhausted Gas during EP



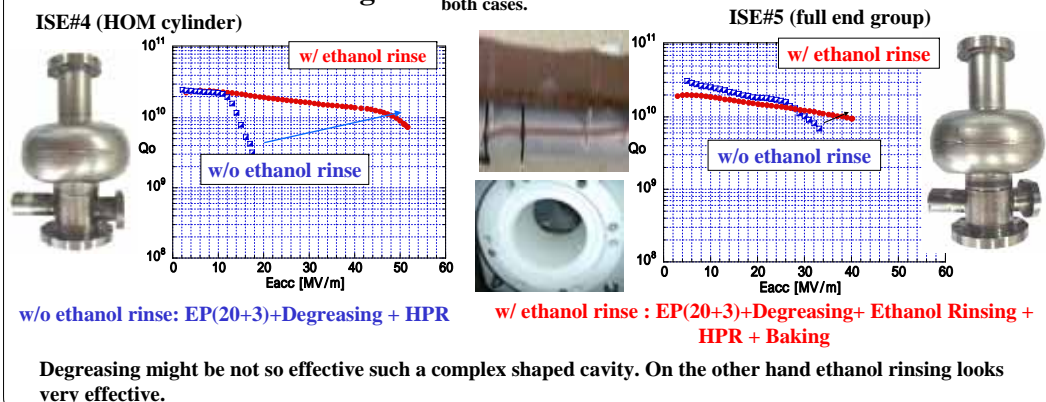
## Qualitative Gas Analysis by Environment Kit on SO<sub>2</sub> and H<sub>2</sub>S



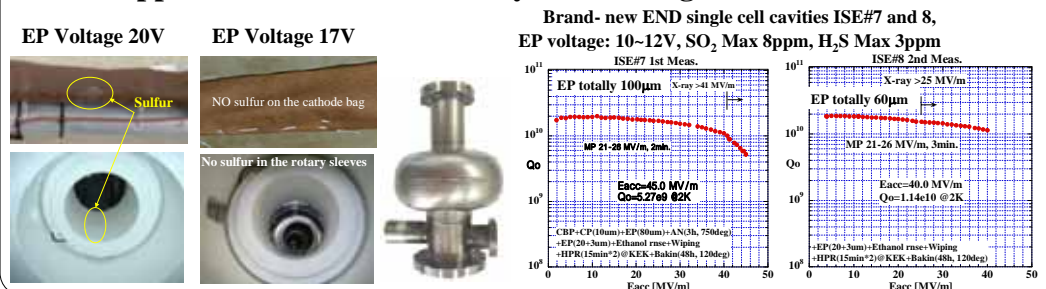
## The Mechanism of the Sulfur Contamination during EP: Decomposition of sulfuric acid



## Effect of Ethanol Rinsing



## Suppressed S-contamination by Low Voltage EP



## Summary

We found that Sulfur contamination is produced mostly by the chemical reaction between SO<sub>2</sub> and H<sub>2</sub>S which are generated by the decomposition of the sulfuric acid. The S-contamination is reduced dramatically at the lower EP voltage.